

HD COLOR CAMERA

HDC1500 Series

OPERATION MANUAL

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only. Afin de réduire les risques d'incendie ou d'électrocution, ne pas exposer cet appareil à la pluie ou à l'humidité. Afin d'écartier tout risque d'électrocution, garder le coffret fermé. Ne confier l'entretien de l'appareil qu'à un personnel qualifié. Um die Gefahr von Bränden oder elektrischen Schlägen zu verringern, darf dieses Gerät nicht Regen oder Feuchtigkeit ausgesetzt werden. Um einen elektrischen Schlag zu vermeiden, darf das Gehäuse nicht geöffnet werden. Überlassen Sie Wartungsarbeiten stets nur qualifiziertem Fachpersonal.

For the customers in the USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

For the customers in Europe

This product with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/ EEC) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European standards:

- EN60950: Product Safety
- EN55103-1: Electromagnetic Interference (Emission)
- EN55103-2: Electromagnetic Susceptibility (Immunity)

This product is intended for use in the following Electromagnetic Environment(s): E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio).

Pour les clients européens

Ce produit portant la marque CE est conforme à la fois à la Directive sur la compatibilité électromagnétique (EMC) (89/ 336/CEE) et à la Directive sur les basses tensions (73/23/ CEE) émises par la Commission de la Communauté Européenne. La conformité à ces directives implique la conformité aux normes européennes suivantes:

- EN60950: Sécurité des produits
- EN55103-1: Interférences électromagnétiques (émission)
- EN55103-2: Sensibilité électromagnétique (immunité)

Ce produit est prévu pour être utilisé dans les environnements électromagnétiques suivants: E1 (résidentiel), E2 (commercial et industrie légère), E3 (urbain extérieur) et E4 (environnement EMC contrôlé, ex. studio de télévision).

Für Kunden in Europa

Dieses Produkt besitzt die CE-Kennzeichnung und erfüllt die EMV-Richtlinie (89/336/EWG) sowie die Niederspannungsrichtlinie (73/23/EWG) der EG-Kommission. Angewandte Normen:

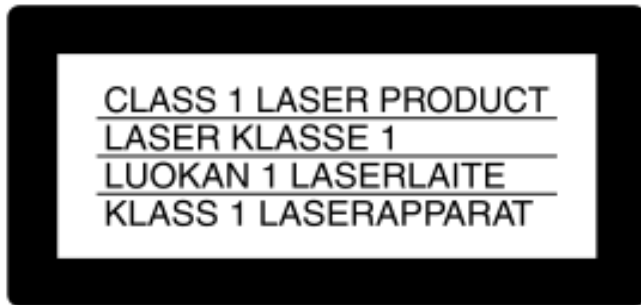
- EN60950: Sicherheitsbestimmungen
- EN55103-1: Elektromagnetische Verträglichkeit

(Störaussendung)

- EN55103-2: Elektromagnetische Verträglichkeit

(Störfestigkeit), für die folgenden elektromagnetischen Umgebungen:

E1 (Wohnbereich), E2 (kommerzieller und in beschränktem Maße industrieller Bereich), E3 (Stadtbereich im Freien) und E4 (kontrollierter EMV-Bereich, z.B. Fernsehstudio).



This HD Color Camera is classified as a CLASS 1 LASER PRODUCT.

Laser diode properties

Wave length: 1310±40 nm

Emission duration: Pulse Modulation

Laser output power: 141 µW

Daten der Laserdiode

Wellenlänge: 1310±40 nm

Emissionsdauer: Pulsmodulation

Laser-Ausgangsleistung: 141 µW

Laserdiode data

Bølgelængde: 1310±40 nm

Strålingsvarighed: Pulse Modulation

Lasereffekt: 141 µW

Laserdiodens egenskaper

Våglängd: 1310±40 nm

Strålningstid: Pulsmodulering

Laserut effekt: 141 µW

Laserdiodens egenskaper

Bølgelengde: 1310±40 nm
Emisjonslengde: Pulsmodulasjon
Laser utgangseffekt: 141 µW

CAUTION

The use of optical instruments with this product will increase eye hazard.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Voor de Klanten in Nederland

- Dit apparaat bevat een vast ingebouwde batterij die niet vervangen hoeft te worden tijdens de levensduur van het apparaat.
- Raadpleeg uw leverancier indien de batterij toch vervangen moet worden. De batterij mag alleen vervangen worden door vakbekwaam servicepersoneel.
- Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).
- Lever het apparaat aan het einde van de levensduur in voor recycling, de batterij zal dan op correcte wijze verwerkt worden.



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36 Overview

Overview

The HDC1500 is a 2/3-type high-definition portable video camera equipped with CCD for 2,200,000 pixels. It incorporates the latest pickup elements and digital signal-processing LSI to yield higher picture quality and higher stability in image creation while maintaining conventional popular functions and operability.

Features

High picture quality and high performance

The new 2/3-type Progressive IT CCD for 2,200,000 pixels conforms to driving formats up to 1080/59.94P, achieving high sensitivity and low smear. In addition, the 14-bit A/D converter and a unique signal-processing LSI provide picture quality of optimal grade.

Multiple formats

The HDC1500 covers 1080/50i and 59.94i interlace, 1080/ 23.98PsF, 24PsF, 25PsF, and 29.97PsF Progressive Scan (PsF) systems. It also covers 720/50P and 59.94P systems. Signal output of 1080/50P and 59.94P from the camera head is possible via the Dual Link interface.

Newly designed integrated unit with low center of gravity

The basic design has been reworked. The stylish appearance with low-slung design improves operability as a portable camera and, when used in combination with the HDLA1500 Large Lens Adaptor, it permits the viewfinder to be mounted at a low position, making the viewfinder position closer to the optical axis of the lens for highly efficient operations.

Swing handle

The swinging structure of the handle enables the large viewfinder to be shifted forward, giving it the same total longitudinal size as a standard studio-use camera, for operability equivalent to that of a standard studio-use camera.

Position-adjustable shoulder pad

The position of the shoulder pad can be adjusted for stable shooting according to the build of the camera operator, the type of lens in use, or the shooting style.

Function-assignable switches

The camera has a switch to which various functions can be assigned on the side panel. You can activate your desired function, such as electronic color-temperature conversion, instantly when shooting by assigning it to the switch in advance. Another switch on the handle is also available as a function assignable switch.

Memory Stick¹⁾ operation

The camera is equipped with a Memory Stick port, which enables setup data storage and software upgrading using Memory Sticks.

1) Memory Stick and  MEMORY STICK[™] are trademarks of Sony Corporation.

Various color-reproduction functions

Selection of the gamma table

Multiple gamma tables are provided, enabling you to use multiple formats and perform flexible image creation.

Multimatrix color correction

In addition to the standard 6-axis matrix function, the camera has a multimatrix function that permits you to adjust the hue and chroma for color components in 16-axis directions independently. This is quite useful in color matching among multiple cameras.

Knee saturation

Change of hue and decrease in chroma that occur in highlighted areas can be compensated. This enables reproduction of natural skin tones under strong lighting.

Low key saturation

Hue and saturation in low-key zones can be compensated. Thus, compensation for color reproduction in all zones is enabled in combination with matrix color compensation and knee saturation functions.

Versatile detail control functions

Skin-tone detail function

This function allows control (emphasis or suppression) of the detail level for just a certain hue or chroma area in the image, by creating a detail gate signal from color components of your specified hue, such as skin tones. The detail levels of three hues can be adjusted independently at the same time.

Detail boost-frequency control

The boost frequency can be adjusted from 20 to 30 MHz. This allows the detail thickness to be set appropriately for the subject, thus enabling more subtle image expression.

H/V ratio control

The ratio between horizontal and vertical detail can be adjusted.

White/black limiter

The white and black details can be limited independently.

Easy menu-based setting

Selections and settings for viewfinder display items, safety-zone marker²⁾ or center marker,³⁾ screen size marker, etc. can be made quickly and easily, using setup menus displayed on the viewfinder screen or an external monitor.

2) Safety zone marker:

A box-shaped marker displayed on the viewfinder screen which indicates 80%, 90%, 92.5%, or 95% of the total screen area

3) Center marker:

A cross-shaped marker which indicates the center of the view

Wide variety of viewfinder display options

Along with items such as operation messages, a zebra pattern,⁴⁾ a safety-zone marker, and a center marker, camera settings may also be displayed on the viewfinder screen. Furthermore, there are other indicators arranged above and below the viewfinder, such as a tally lamp, battery warning indicator, and an indicator to tell you that one or more settings are other than standard. This makes it simple to check

the status of the camera.

4)Zebra pattern:

A stripe pattern displayed on the viewfinder screen which indicates the portions where the video level is above about 70% or 100%. Used to check the video level of the subject.

Optical digital transmission

The camera uses electro-optical coding cable for 1.5- gigabit digital optical transmission between the camera and a Camera Control Unit.

High-resolution 2-type monochrome and 2.7-type color multiformat viewfinders (optional)

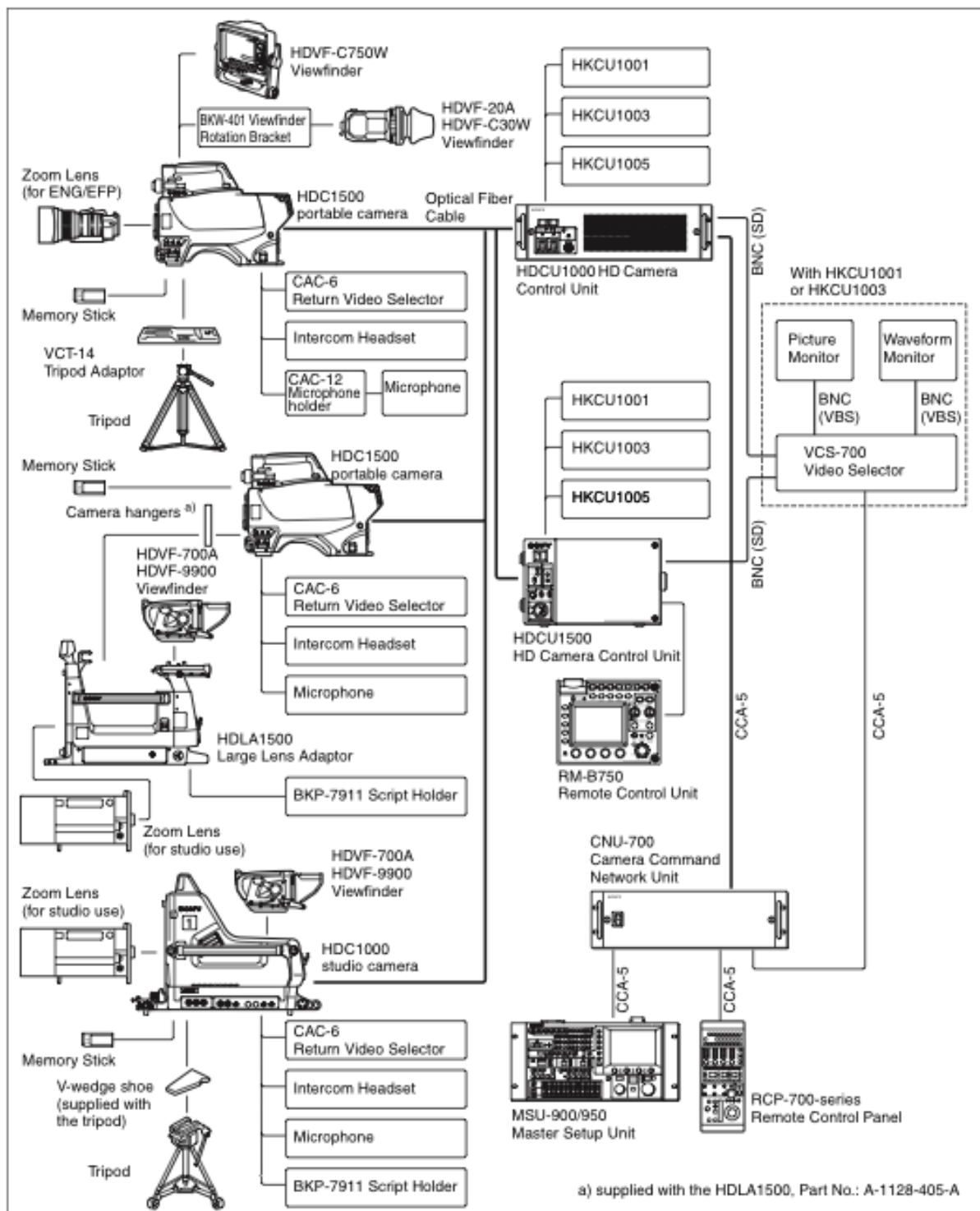
The HDVF-20A, a multiformat 2-type monochrome CRT viewfinder, and the HDVF-C30W, a multiformat 2.7-type color LCD viewfinder, are available as options to cover various applications.

Prevention of electrical shock

When the power connection is unsafe, the power supply from the connected Camera Control Unit will be shut off.

System Configuration

Accessories and related equipment for the HDC1500 are shown in the figure below.



Precautions

Note on laser beams

Laser beams may damage the CCDs. If you shoot a scene that includes a laser beam, be careful not to let a laser beam become directed into the lens of the camera.

Do not subject to severe shocks

Damage to the case or internal components may result.

When finished using

Turn off the power switch.

Operation and storage environment

Store in a level place with air conditioning.

Avoid use or storage in the following places:

- Extremely hot or cold places
- Places with high humidity
- Places with strong vibration
- Near strong magnetic fields
- In places where it receives much direct sunlight, or near heating equipment

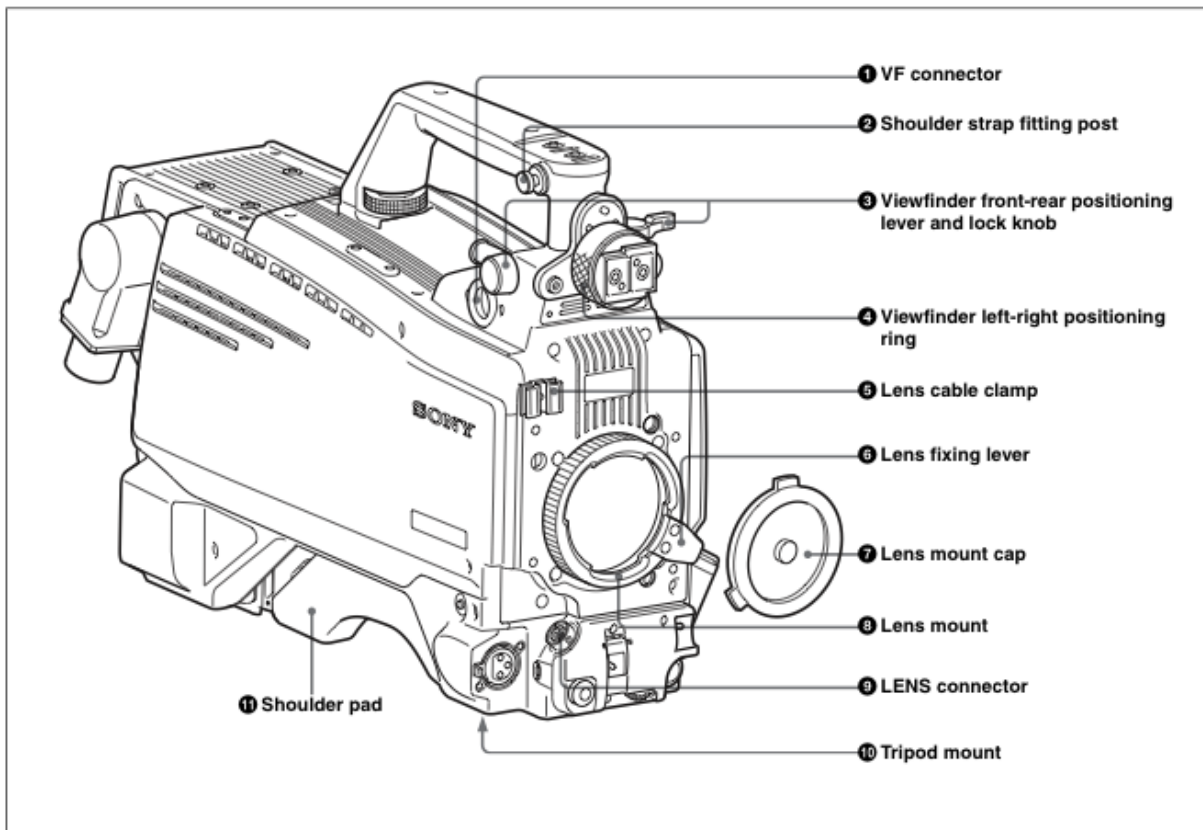
Dew condensation

If you move the camera from a very cold place to a warm place, or use it in a damp location, dew may form on the lens or inside the camera.

The camera has no built-in dew indicator. If you find dew on the body or lens, switch the camera off and wait for the dew to disappear for about one hour.

Locations and Functions of Parts

Accessory Attachments



a) VF (viewfinder) connector (20-pin)

Connect the cable of the viewfinder (not supplied).

b) Shoulder strap fitting post

Attach one end of a shoulder strap (not supplied) to this fitting post, and the other end to the fitting post on the other side of the camera.

c) Viewfinder front-rear positioning lever and LOCK knob

Loosen the lever and knob to adjust the viewfinder position towards the front or rear.

d) Viewfinder left-right positioning ring

Loosen this ring to adjust the viewfinder position towards the left or right.

For details on adjusting the viewfinder position, see “Attaching a Viewfinder” on page 48.

e) Lens cable clamp

Used to secure the cable of the lens (not supplied).

f) Lens fixing lever

Used to secure the lens in the lens mount.

g) Lens mount cap

Cover the lens mount with this cap when a lens is not attached. The cover may be removed by moving the lens fixing lever upwards.

h) Lens mount

Used to attach a lens (not supplied).

i) LENS connector (12-pin)

Connect the lens cable. The camera can control the lens functions through this cable.

j) Tripod mount

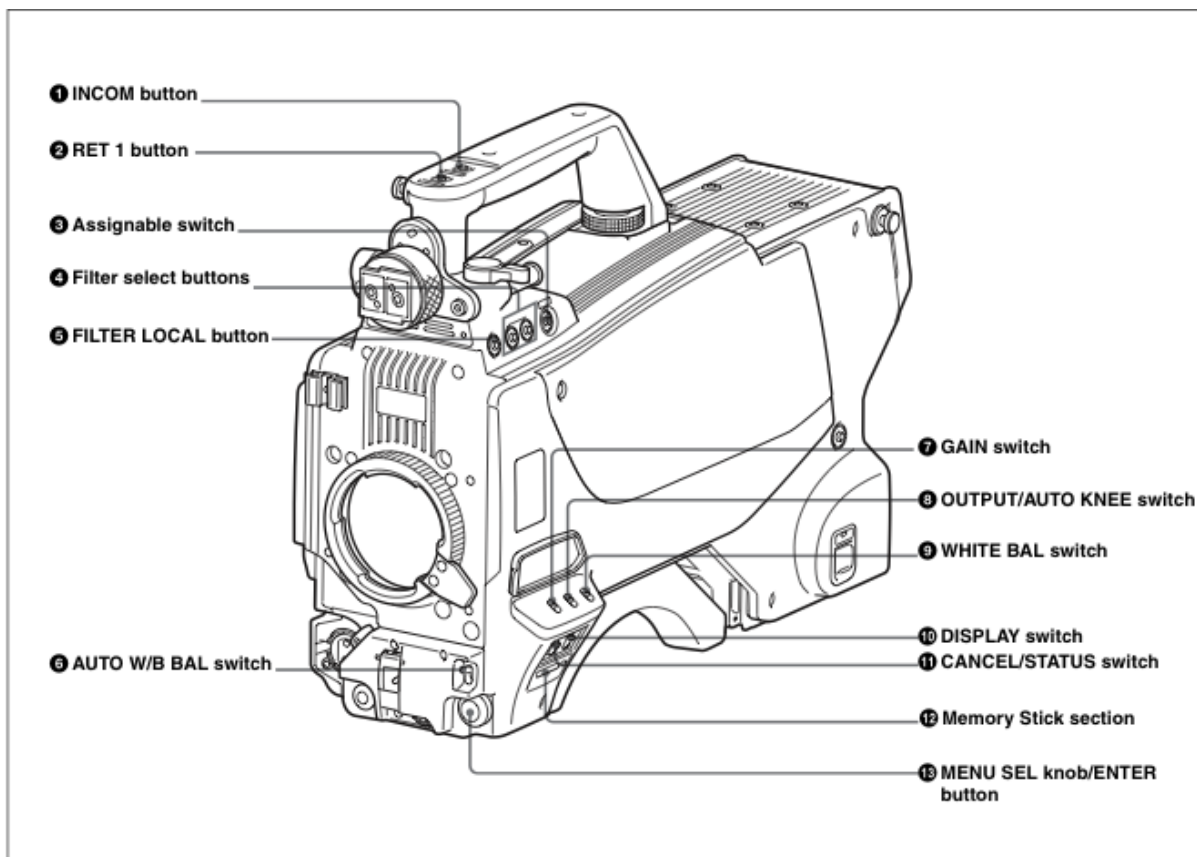
Attach the VCT-14 Tripod Adaptor when mounting the camera on a tripod.

k) Shoulder pad

You can adjust the position so that you can get the best balance for shooting with the camera on your shoulder.

For details, see “Adjusting the Shoulder Pad Position” on page 49.

Controls and Connectors Front right



a) INCOM (intercom 1) button

The intercom 1 microphone is turned ON while this button is pressed.

b) RET 1 (return video 1) button

The return video 1 signal from the camera control unit is monitored on the viewfinder screen while this button is pressed. It function the same as the RET 1 button on the side (*page 43*) and that on the operation panel on the rear of the camera .

c) Assignable switch

You can assign a function using the menu displayed on the viewfinder screen.

d) Filter select buttons

You can switch the built-in ND and CC (color temperature conversion) filters by pressing the selectors while holding the FILTER LOCAL button depressed. Pressing the left button selects the available ND filters (clear, 1/4ND, 1/8ND, 1/16ND, 1/64ND) in sequence. Pressing the right button selects the available CC filters (cross, 3200K, 4300K, 6300K, 8000K) in sequence.

e) FILTER LOCAL button

While holding this button depressed, press either of the filter select button to select the ND or CC filters.

f) AUTO W/B BAL (white and black balance automatic adjustment) switch

Used to automatically adjust white and black balance when the camera is used in stand-alone status without connecting to the camera control unit.

WHT: Automatically adjust white balance.

BLK: Automatically adjust black balance.

g)GAIN switch

Used to select the gain of the video amplifier based on lighting conditions when the camera is used in stand-alone status without connecting a camera control unit.

When shipped from the factory, the values set are L = 0 dB, M = 6 dB, and H = 12 dB.

h)OUTPUT (output signal selection)/AUTO KNEE switch

Used to select the signal (color bar signal or camera's video signal) to be used as output to a VTR, the viewfinder or a video monitor when the camera is used in stand-alone status without connecting a camera control unit. When the camera's video signal is being used as output, the auto knee function may be used. The relationship between the switch setting and the output signal and auto knee function is shown in the table below.

OUTPUT	AUTO KNEE	Function
BARS	OFF	Output is a color bar signal.
CAM	OFF	Output is the camera's video signal. The auto knee circuit is disabled.
CAM	ON	Output is the camera's video signal. The auto knee circuit is enabled.

i)WHITE BAL (white balance memory selection) switch

Used to select the white balance adjustment method or the memory used to store the adjusted value when the camera is used in stand-alone status without connecting a camera control unit.

PRST (preset): White balance is adjusted to a preset value corresponding to a color temperature of 3200K.

A or B: Selects memory A or B. When the AUTO W/B BAL switch is set to WHT, the white balance will be automatically adjusted according to the setting of the FILTER control. The adjusted value will be stored in the selected memory. Each memory can store up to four adjusted values, for a total of 8.

j)DISPLAY switch

The functions of the DISPLAY switch are as follows:

ON: Characters and messages showing the camera settings and operating status may be displayed on the viewfinder screen.

OFF: Status messages will not appear on the viewfinder screen.

MENU: Menus for camera settings will be displayed on the viewfinder screen.

k)CANCEL/STATUS switch

When a menu is displayed on the viewfinder screen, you can cancel any changed settings or return the display to the previous menu. When no menu is displayed on the viewfinder screen, the status information of this camera is displayed.

l)Memory Stick section

A slot to accommodate a "Memory Stick" and an access lamp are provided behind the panel. The access lamp lights in red while writing or reading data to/from a "Memory Stick."

Note

Do not insert/remove the “Memory Stick” when the access lamp lights.

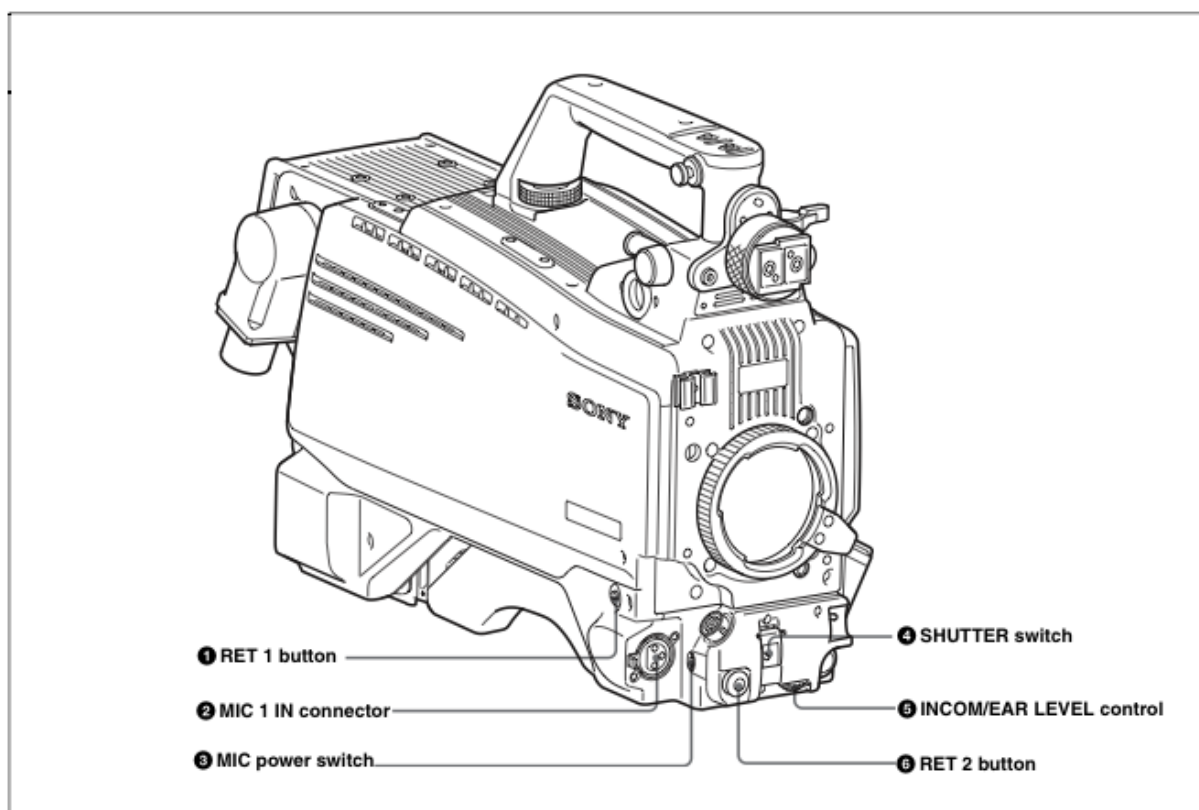
m)MENU SEL (menu select) knob/ENTER button (rotary encoder)

Used to select settings from menus displayed on the viewfinder screen (by rotating the knob) and to confirm settings (by pushing the button).

Note

When a camera control unit or a remote control device, such as MSU-900/950 and the RCP-700-series Remote Control Panel, is connected, the functions of 6 to 9 are controlled from the external control device and the controls on the camera are disabled.

Front left



a)RET 1 (return video 1) button

The return video 1 signal from the camera control unit is monitored on the viewfinder screen while this button is pressed. It function the same as the RET1 buttons on the handle and that on the operation panel on the rear of the camera .

b)MIC 1 IN (microphone 1 input) connector (XLR 3- pin)

Connect a microphone. This connector and the AUDIO IN CH-1 connector on the operation panel on the rear of the camera are alternately activated with the CH1 input select switch

c)MIC (microphone) power switch +48V:

To supply a power of +48 V to the connected microphone.

OFF: Not to supply a power to the connected microphone.

d)SHUTTER switch

Used for setting the electronic shutter functions when the camera is used in stand-alone status without connecting a camera control unit.

OFF: The electronic shutter does not function.

ON: The electronic shutter is activated.

SEL: The shutter speed and shutter mode change each time the switch is set to this position.

For details, see “Setting the Electronic Shutter” on page 54.

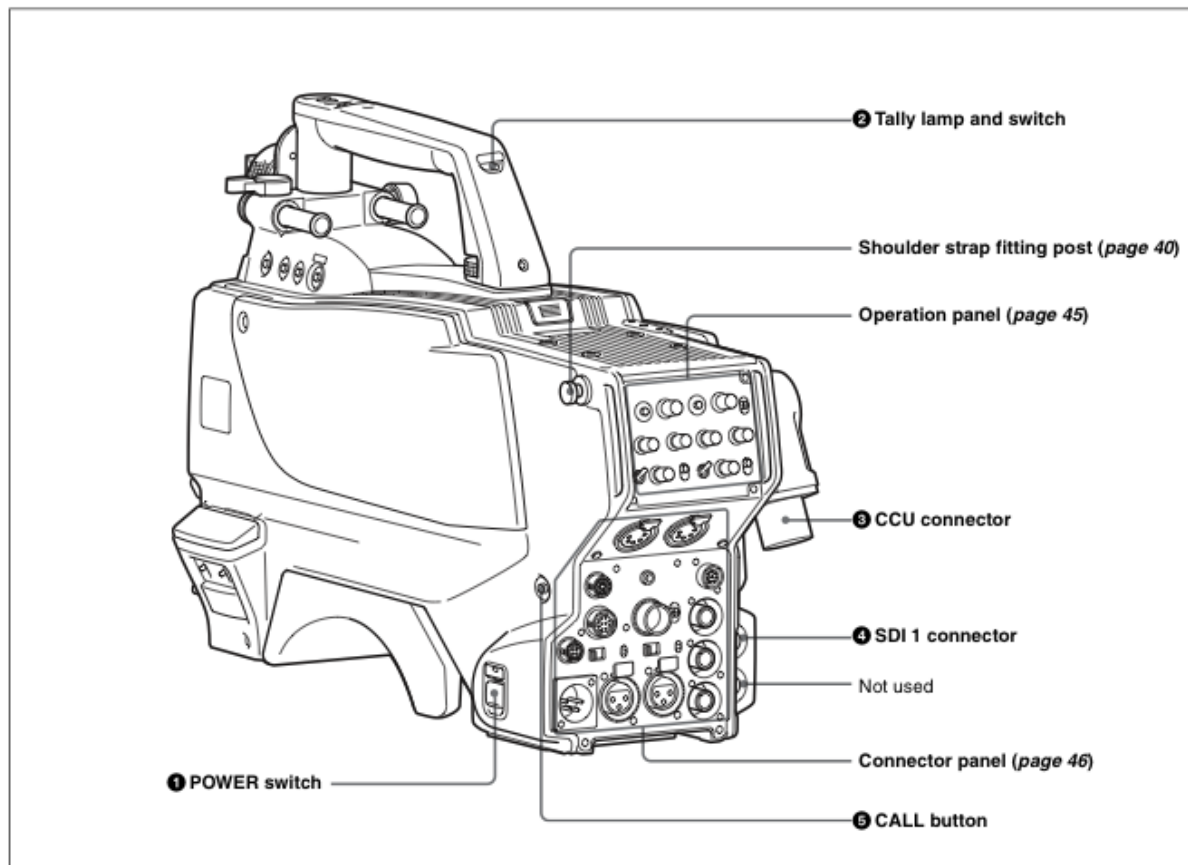
e)INCOM/EAR (intercom/earphone) LEVEL control

To adjust the intercom/earphone volume level. The intercom level adjustment is enabled when the INTERCOM 1 and 2 LEVEL/MIC switches on the operation panel on the rear of the camera are set to “FRONT.”

f)RET 2 (return video 2) button

When this button is pressed, the picture on the viewfinder changes to the return video signal selected with the RET 2 select switch on the operation panel on the rear of the camera.

Rear



a)POWER switch

CCU: Power supply will be received from the camera control unit.

EXT: Power supply will be received through the DC IN connector.

b)Tally lamp and switch

ON: The tally lamp lights upon a tally signal input to the connected camera control unit or a call signal generated by pressing a CALL button.

OFF: The tally lamp is prevented from lighting.

c)CCU (Camera Control Unit) connector (optical multi connector)

Connect a camera control unit via an optical electro- composite cable.

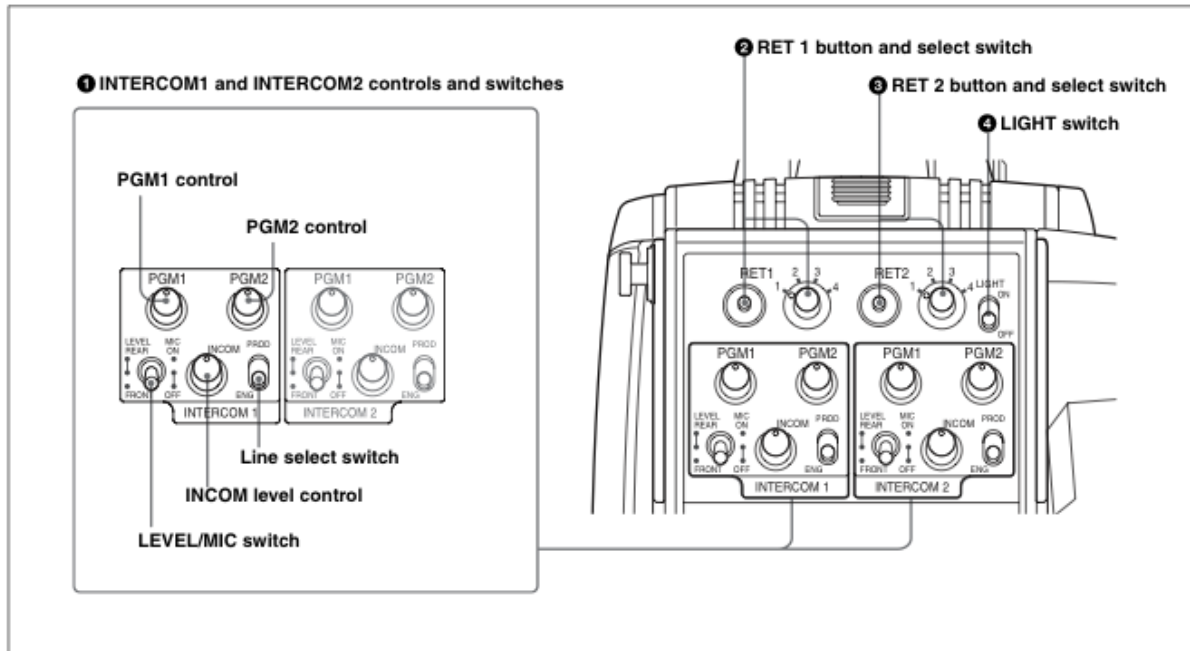
d)SDI 1 (serial digital interface 1) connector (BNC type)

Used for HD SDI signal output.

e)CALL button

When you press this button, the red tally lamp of the RCP- 700-series Remote Control Panel or the MSU-900/950 Master Setup Unit, will light. Use to call the operator of the RCP or MSU.

Operation Panel



a)INTERCOM1 and INTERCOM2 controls and switches

There are PGM1 and 2 controls incorporated with a line select switch, a LEVEL/MIC switch, and INCOM level control each for intercom line 1 and 2.

PGM1 (program 1) control

Adjust the audio reception level of program 1.

PGM2 (program 2) control

Adjust the audio reception level of program 2.

LEVEL/MIC switch

REAR/ON: The intercom headset microphone is turned on. The intercom audio reception level is adjusted with the INCOM level control.

REAR/OFF: The intercom headset microphone is turned off. The intercom audio reception level is adjusted with the INCOM level control.

FRONT/OFF: The intercom headset microphone is turned off. The intercom audio reception level is adjusted with the INCOM/EAR LEVEL control on the front of the camera.

INCOM level control

Adjust the intercom audio reception level.

Line select switch

Select the intercom line.

PROD: Producer line

ENG: Engineer line

b)RET 1 (return video 1) button and select switch

The return video signal selected with the switch is displayed on the viewfinder screen while the button is pressed.

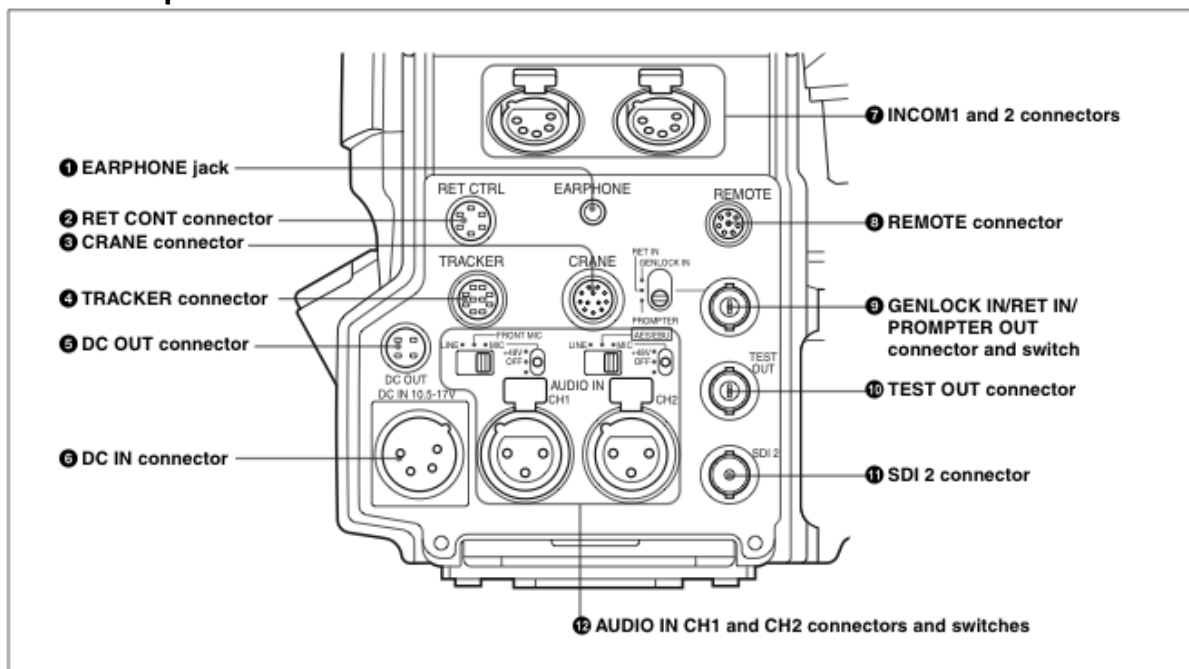
c)RET 2 (return video 2) button and select switch

When other return video systems are used in addition to return video 1, you can monitor the signal selected with the switch on the viewfinder screen while pressing the button. The RET 1 button has priority over the RET 2 button if both buttons are pressed.

d)LIGHT switch

Set to ON to illuminate the operation panel.

Connector panel



a)EARPHONE jack (stereo minijack)

Connect an earphone or headset for output of the intercom.

b)RET CONT (return control) connector (6-pin)

Used for connection to a CAC-6 Return Video Selector.

c)CRANE connector (12-pin)

For external interface, such as viewfinder and external data.

d)TRACKER connector (10-pin)

For external interface, such as intercom and tally.

e)DC OUT (DC power supply output) connector (4- pin)

Used to supply power to devices such as a wireless receiver (optional).

f)DC IN (DC power supply input) connector (XLR 4- pin)

Used for connection to the AC-DN10 AC Adaptor to supply power to the camera.

g)INCOM1 and 2 (intercom 1 and 2) connectors (XLR 5-pin)

Used for input and output of intercom audio signals.

h)REMOTE connector (8-pin)

Used for connection to an RM-B150/B750 Remote Control Unit, RCP-700-series Remote Control Panel, or MSU-900/950 Master Setup Unit. When the camera is connected to a CCU, do not connect any device to this connector.

i)GENLOCK IN₁/RET IN₁/PROMPTER OUT (external gen-lock signal input/return video signal input/prompter signal output) connector (BNC type) and switch

Set the switch according to the signal at the connector.¹⁾

GENLOCK IN: Used for input of an external gen-lock signal when the camera is used without connecting a camera control unit

RET IN: Used for input of the return video signal (HD-Y) when the camera is used without connecting a camera control unit

PROMPTER OUT: Used for output of a prompter signal (valid only when a camera control unit is connected)

1) For future use

j)TEST OUT connector (BNC type)

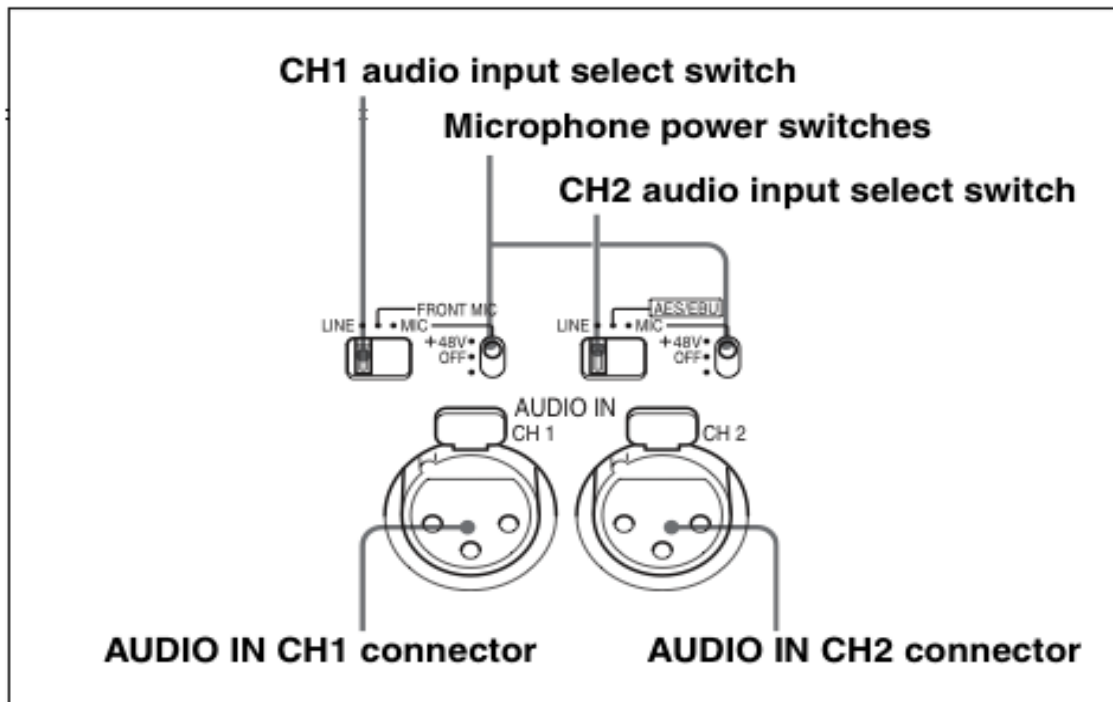
Used to output the analog signal. This also supplies the VBS signal, an HD signal nearly equal to the signal output from the VF connector, an HD- SYNC signal, or an SD-SYNC signal depending on which of these you have selected on the menu.

k)SDI 2 (serial digital interface 2) connector (BNC type)

Used for HD SDI or SD SDI signal output.

l)AUDIO IN CH1 and CH2 connectors (XLR 3-pin) and switches

Connect audio signals. An input select switch and microphone power switch are provided for each channel.



CH1 audio input select switch

Set to the appropriate position according to the equipment connected to the AUDIO IN CH1 connector.

LINE: When a line-level (0 dBm) signal source is connected

FRONT MIC: When using the microphone connected to the MIC 1 IN connector

MIC: When an external microphone is connected

CH2 audio input select switch

Set to the appropriate position according to the equipment connected to the AUDIO IN CH2 connector.

LINE: When a line-level (0 dBm) signal source is connected

AES/EBU: When a digital audio signal is connected (The signal must be in synchronization with the camera output.)

MIC: When an external microphone is connected

Microphone power switches

When a microphone is connected to the corresponding AUDIO IN connector, set whether or not to supply a power to the microphone.

+48V: To supply a power of +48 V

OFF: Not to supply a power

(No function has been assigned to the lowermost position. No power is supplied to the microphone.)

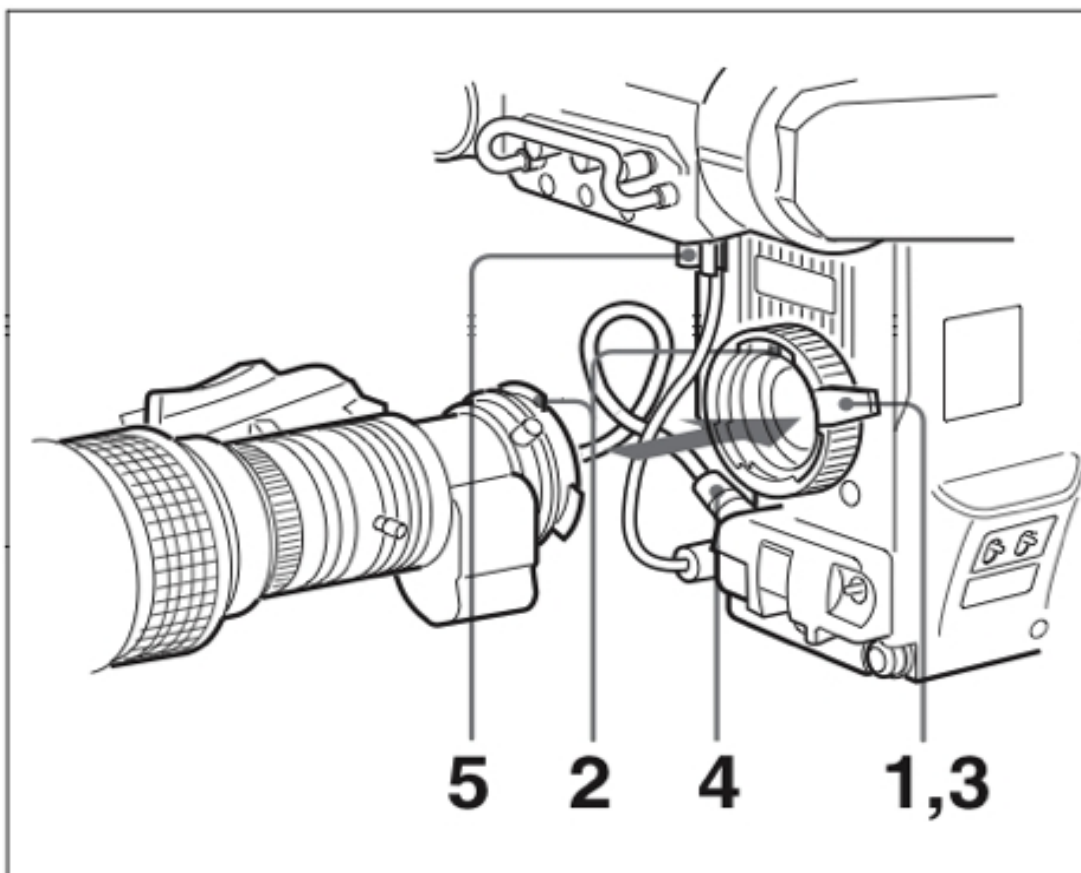
To supply a power of +12 V, modification of the camera is required.

Preparations

Attaching a Lens

The procedure for attaching a lens to the camera is as follows:

For information on handling lenses, refer to the lens' operation manual.



- 1** Push the lens fixing lever upwards and remove the lens mount cap from the lens mount.
- 2** Align the lens' alignment pin with the notch in the upper part of the lens mount and insert the lens into the mount.
- 3** While supporting the lens, push the lens fixing lever downwards to secure the lens.
- 4** Connect the lens cable to the LENS connector.
- 5** Secure the lens cable with the cable clamp.

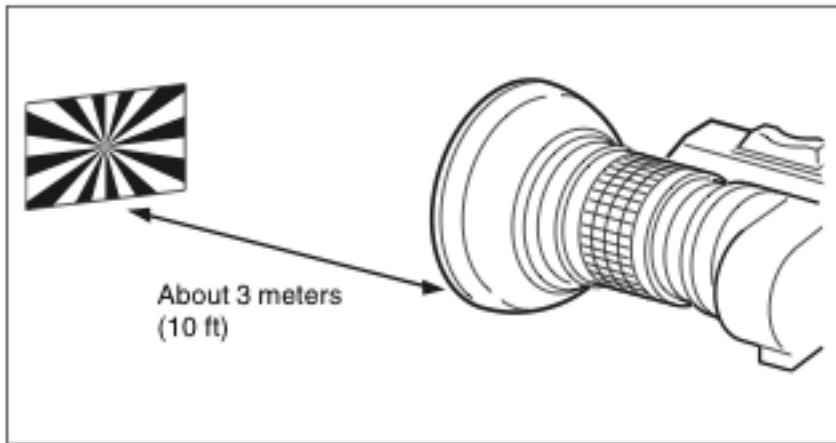
Adjusting the Flange Focal Length

Adjustment of the flange focal length¹⁾ is necessary in the following situations.

- The first time a lens is attached
- When changing lenses
- When zooming and the focus is not sharp at both telephoto and wide angle

Note

The various parts of the lens used in adjusting the flange focal length are in different positions on different lenses. Refer to the lens' operation manual. The procedure for adjusting the flange focal length is as follows:



- 1** Set the iris control to manual, and open the iris fully.
- 2** Place a flange focal length adjustment chart approximately 3 meters from the camera and adjust the lighting to get an appropriate video output level.
- 3** Loosen the Ff²⁾ ring lock screw.
- 4** With either manual or power zoom, set the zoom ring to telephoto.
- 5** Aim at the flange focal length adjustment chart and turn the focus ring to focus the image.
- 6** Set the zoom ring to wide angle.
- 7** Turn the Ff ring to bring the chart in focus. Take care not to move the distance ring.
- 8** Repeat steps **4** through **7** until the image is focus at both telephoto and wide angle.
- 9** Tighten the Ff ring lock screw.

1) Flange focal length: The distance between the lens mount attachment

plane and the imaging plane

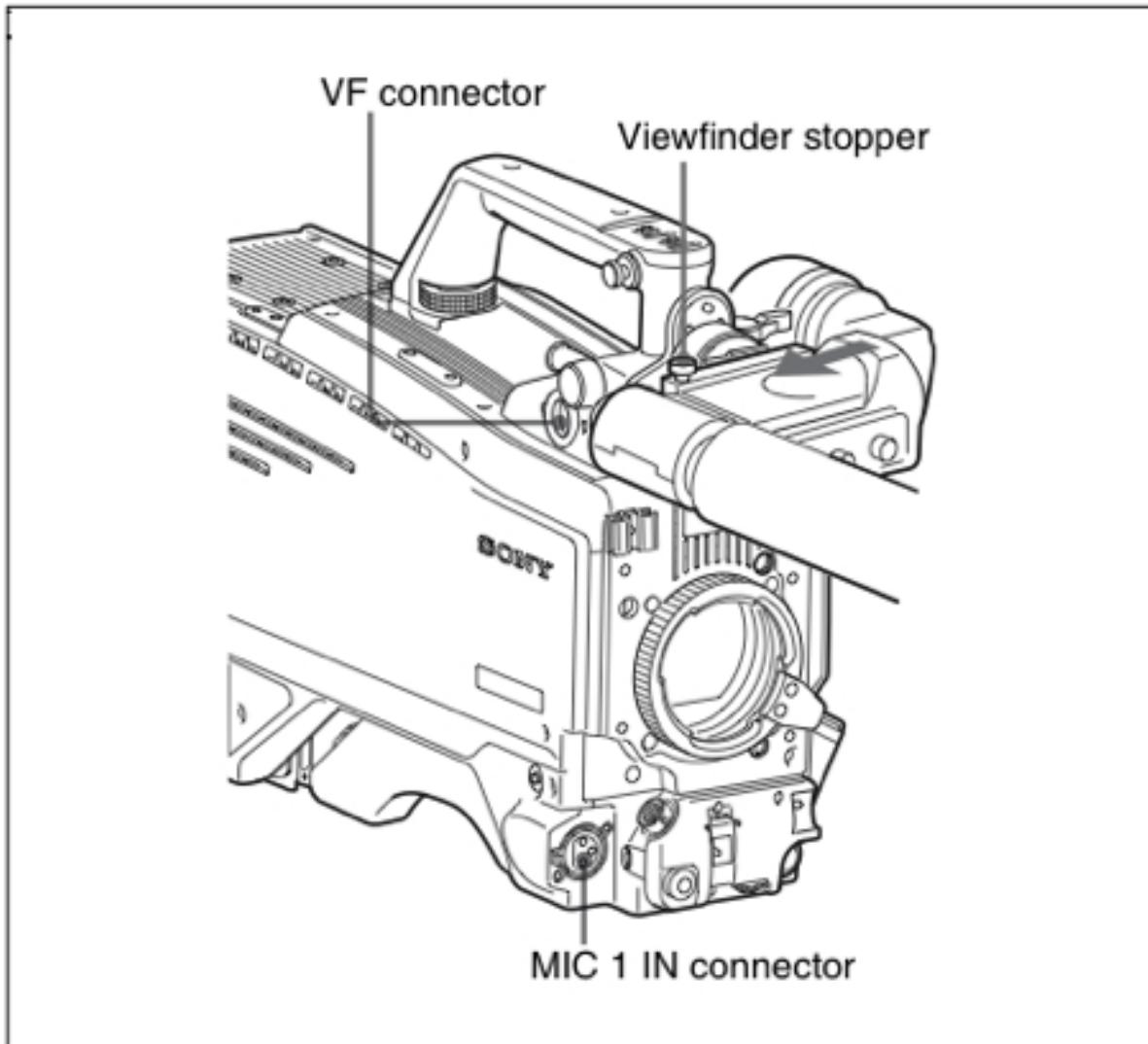
2)Ff: Abbreviation of flange focal length

Attaching a Viewfinder

Example: Attaching a HDVF-20A/C30W Viewfinder

For details on the viewfinder, refer to the instruction manual of the viewfinder.

Attaching procedure



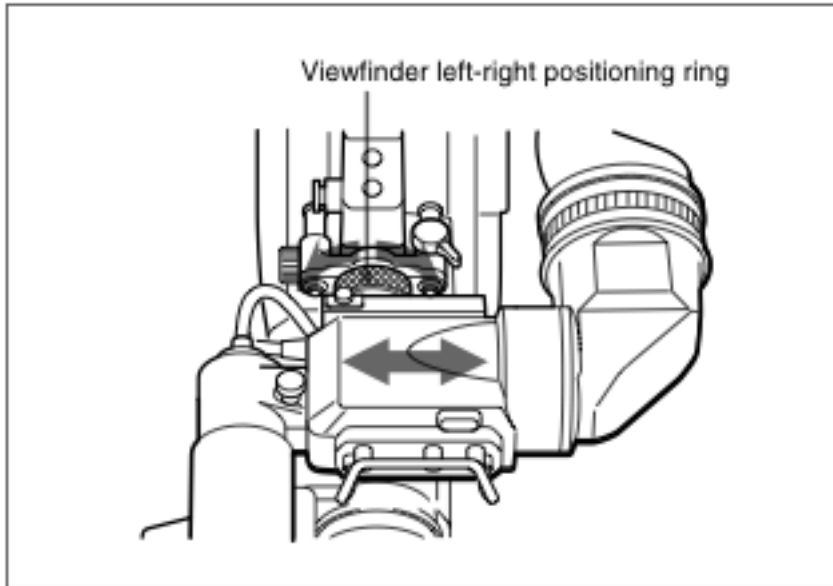
- 1** Slide the viewfinder in the direction of the arrow. The viewfinder stopper automatically pops down.
- 2** Loosen the viewfinder left-right positioning ring, slide the viewfinder side to side to the most convenient position and tighten the ring.
- 3** Connect the viewfinder cable to the VF connector of the camera.
- 4** Connect the microphone cable to the MIC 1 IN connector of the camera.

Adjusting the viewfinder position

The viewfinder position may be adjusted towards the front and rear and to the left and right to make it

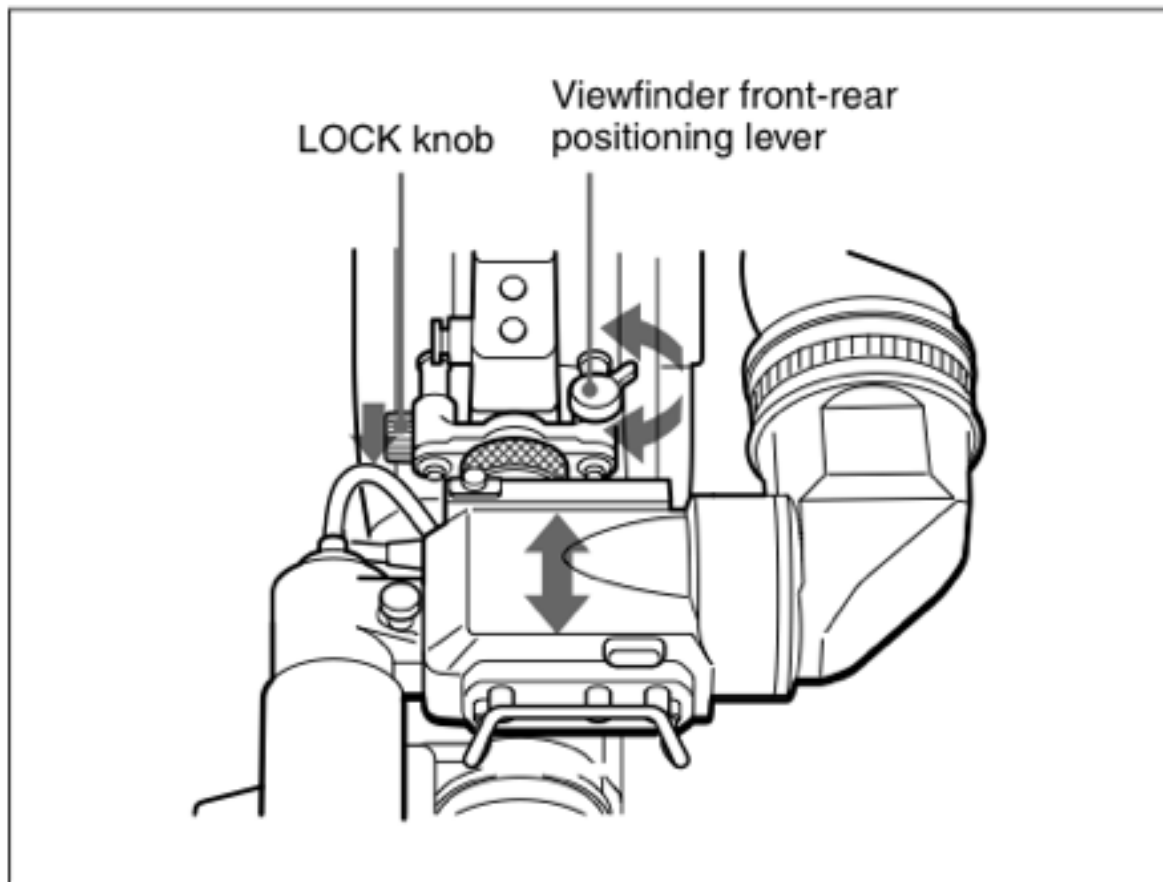
easy to see into it.

To adjust the position to the left or right



- 1** Loosen the viewfinder left-right positioning ring.
- 2** Slide the viewfinder left or right to move it into a good viewing position.
- 3** Tighten the viewfinder left-right positioning ring.

To adjust the position forward or backward



- 1** Loosen the viewfinder front-rear positioning lever and LOCK knob.

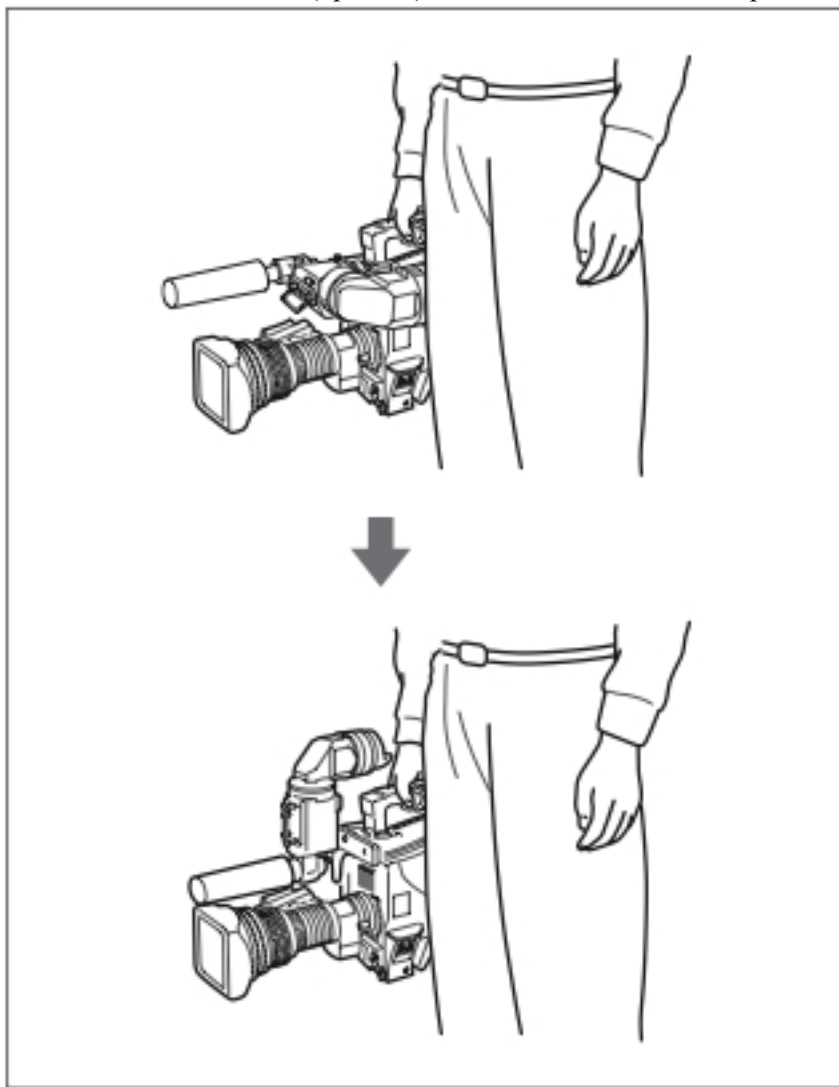
- 2** Slide the viewfinder towards the front or rear of the camera to move it into a good viewing position.
- 3** Tighten the viewfinder front-rear positioning lever and LOCK knob.

To detach the viewfinder

Loosen the viewfinder left-right positioning ring, pull the viewfinder stopper, then pull out the viewfinder by sliding it in the direction opposite to that when attached.

Keeping the viewfinder from hitting your leg

To keep the viewfinder from bumping your leg when carrying the camera, install the BKW-401 Viewfinder Rotation Bracket (optional) and rotate the viewfinder upwards.



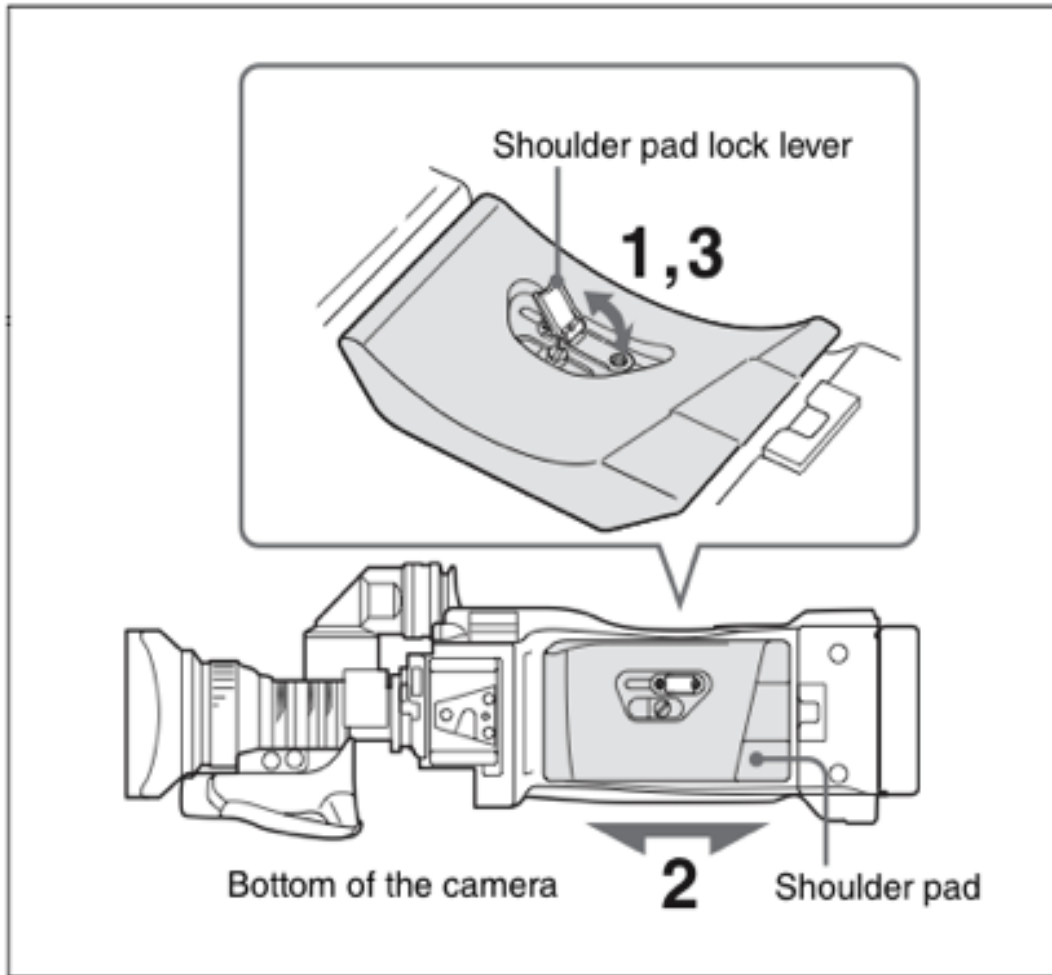
Note

Lock the viewfinder in a slightly forward position before rotating it upwards. If the viewfinder is in its rearmost position, the arm of the viewfinder rotation bracket will strike the grip.

Adjusting the Shoulder Pad Position

You can shift the shoulder pad from its center position (factory setting) backward by up to 10 mm (3/8 inch) or forward by up to 25 mm (1 inch). This adjustment helps you get the best balance for shooting

with the camcorder on your shoulder.



Adjusting procedure

- 1** Raise the lever in the center of the shoulder pad to unlock the shoulder pad.
- 2** Slide the shoulder pad backward or forward until it is in the most convenient position.
- 3** Bring down the lever to lock the shoulder pad in the selected position.

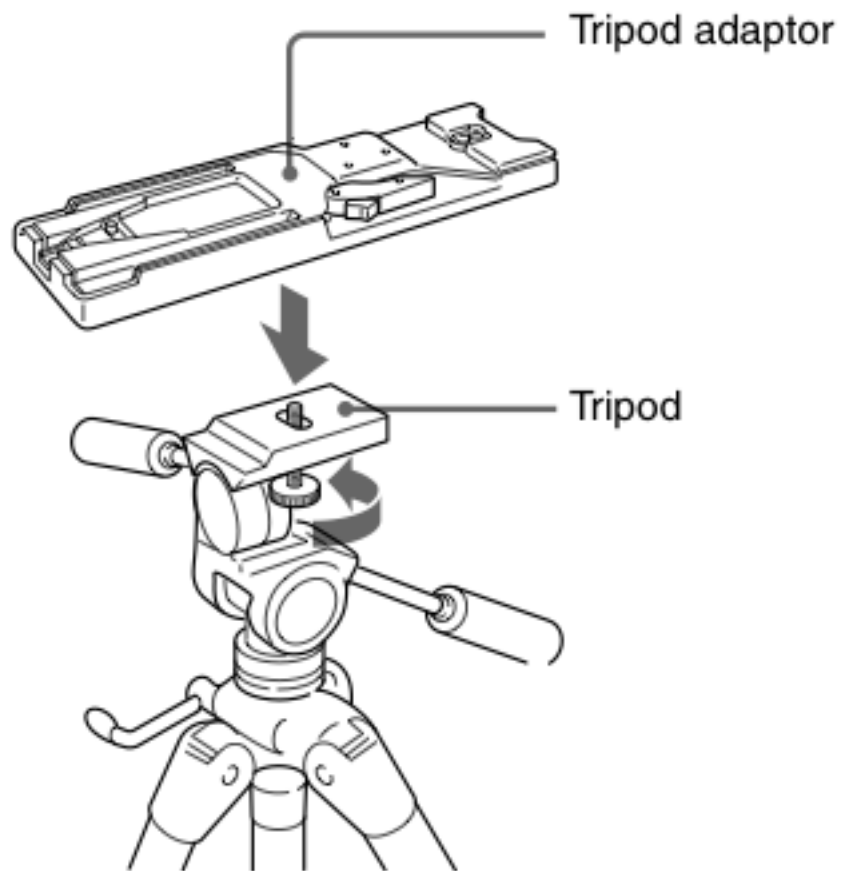
Mounting the Camera to a Tripod

Mount the camera to a tripod using a VCT-14 Tripod Adaptor.

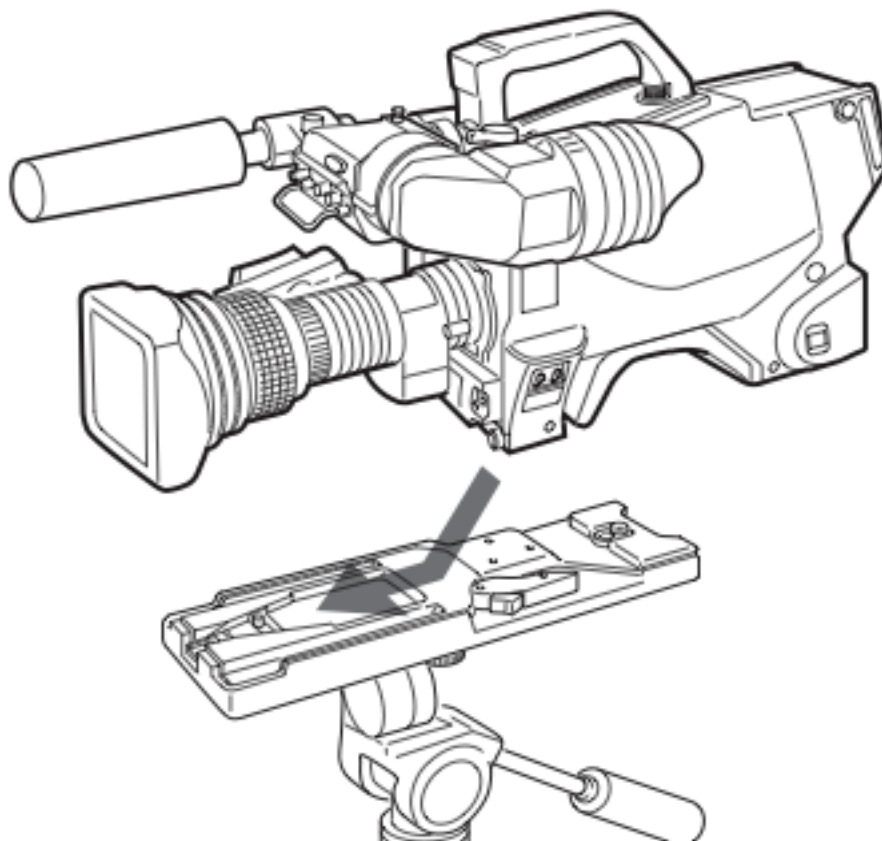
- Select an appropriate hole from among those at the bottom of the tripod adaptor considering the balance of the weight of the camera and the tripod adaptor. If an inappropriate hole is selected, the camera may fall over.
- Check that the size of the selected hole matches that of the screw of the tripod. If they do not match, the tripod adaptor cannot be attached to the tripod securely.

Mounting procedure

- 1** Attach the tripod adaptor to the tripod and secure it with the screw.

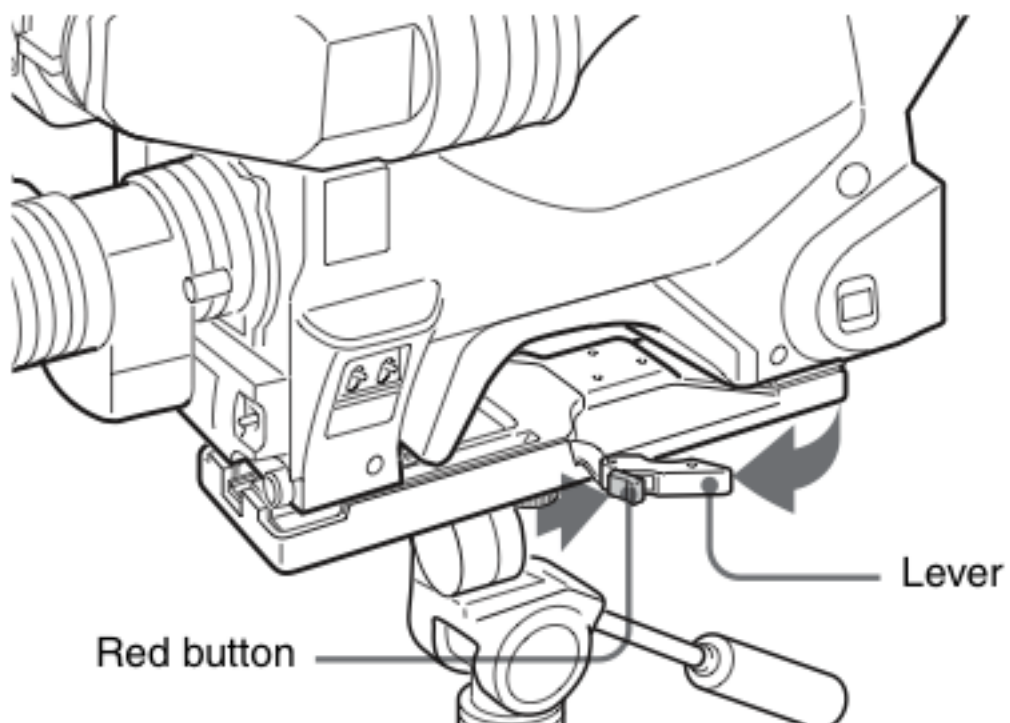


2 Place the camera on the tripod adaptor, and slide forward it along the groove of the tripod adaptor until it clicks.



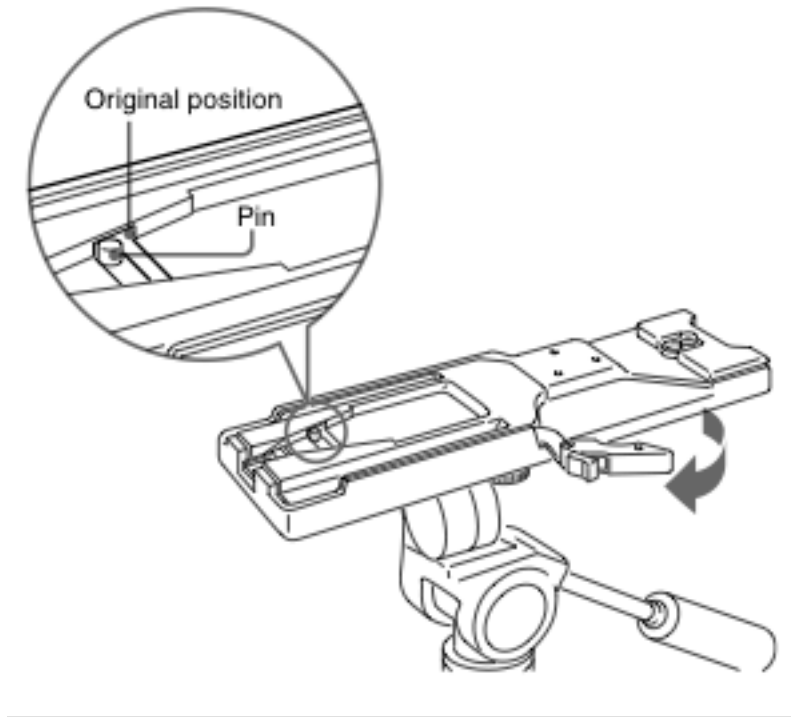
To remove the camera from the tripod adaptor

Hold down the red button and pull the lever in the direction of the arrow.



If the pin of the tripod adaptor does not return to its original position

After removing the camera, if the pin of the tripod adaptor does not return to its original position, hold down the red button and move the lever in the direction of the arrow to return the pin to its original position. It is not possible to mount a camera with the pin not seated.



Adjustments and Settings for Recording

Adjusting the Black Balance and White Balance

In order to maintain high picture quality when using the camera, it is necessary to set the black balance and white balance appropriately for the conditions. When a camera control unit or a remote control device, such as MSU-900/950 and the RCP-700-series Remote Control Panel, is connected, the black balance and white balance are controlled from the external control device and controls on the camera are disabled.

Black balance adjustment

The black balance needs adjustment in situations like the following:

- The first time the camera is used
- When the camera is used after a long period of disuse
- When the surrounding temperature changes greatly
- When the gain value is changed using the setup menus

Normally, there is no need to adjust the black balance every time the camera is turned on.

White balance adjustment

Always readjust the white balance when lighting conditions change.

About the viewfinder screen

After the process of adjusting the black balance or white balance begins, messages about the progress

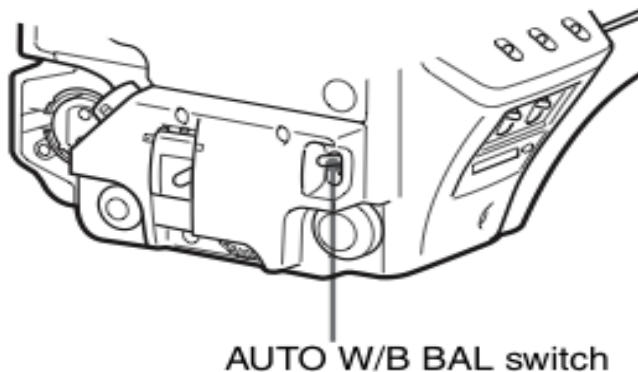
and results of the adjustment will be displayed on the viewfinder screen. Adjusted values set through automatic adjustment, and other settings, are stored in the camera's memory and preserved even when the camera power is turned off.

Adjusting the black balance

In automatic adjustment of black balance, both the black set and black balance are adjusted.

Procedure for adjusting the black balance

1 Push the AUTO W/B BAL switch to BLK and release the switch.



The switch will return to the center position, and adjustment will be performed.

During adjustment, a message like the one in the figure below will be displayed on the viewfinder screen.



After a few seconds the adjustment process will be complete, and the message "ABB: OK" will be displayed. The adjusted value is automatically stored in memory.

Note

- During black balance adjustment, the iris will be automatically closed.

- During black balance adjustment, the gain switching circuit will work automatically, and the viewfinder screen will flicker several times. This is not a malfunction.

When automatic black balance adjustment fails

If the automatic black balance adjustment process does not end successfully, the error message “ABB: NG” will be displayed on the viewfinder screen for approximately three seconds. If this error message is displayed, try black balance adjustment again. If the error message continues to be displayed after several attempts, the camera requires internal inspection.

About black balance memory

The black balance values stored in memory will be preserved even when the camera power is turned off.

Adjusting the white balance

Automatic adjustment of white balance is performed with the following procedure:

Procedure for adjusting the white balance

- 1** Set the WHITE BAL switch to A or B.



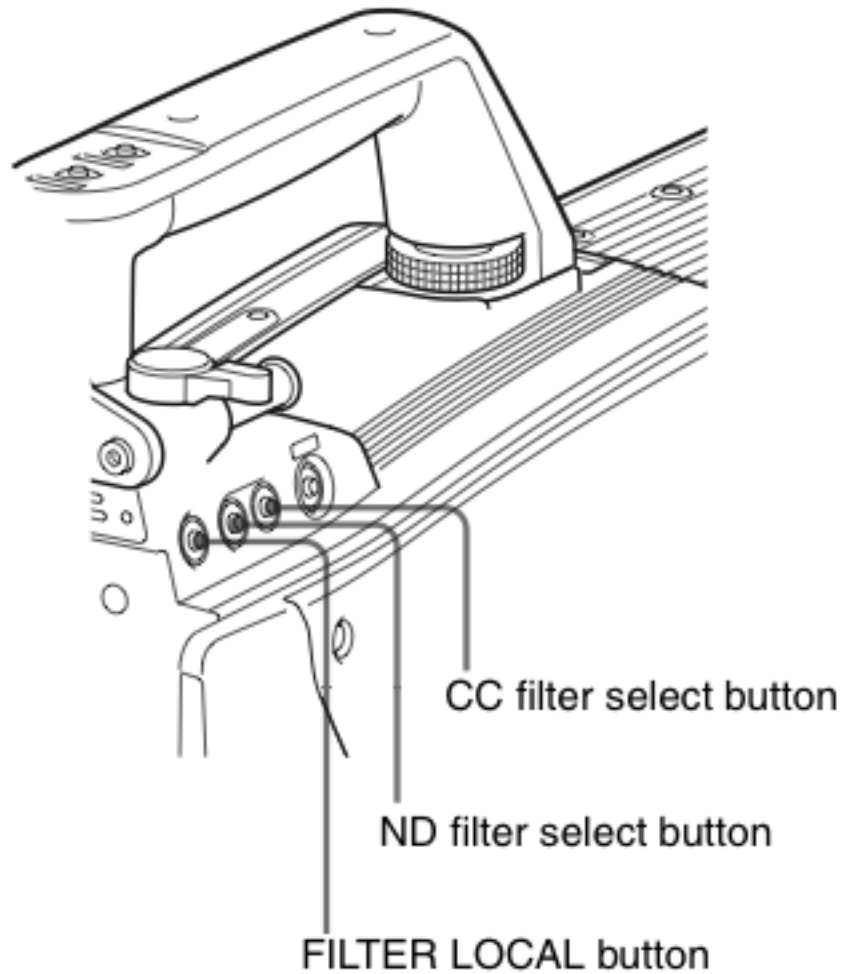
- 2** Select the filters setting according to the lighting conditions.

To select the ND filter

Press the ND filter select button while holding the FILTER LOCAL button depressed. Each press of the select button switches the available ND filters (clear, 1/4ND, 1/8ND, 1/16ND, 1/64ND) in sequence.

To select the CC filter

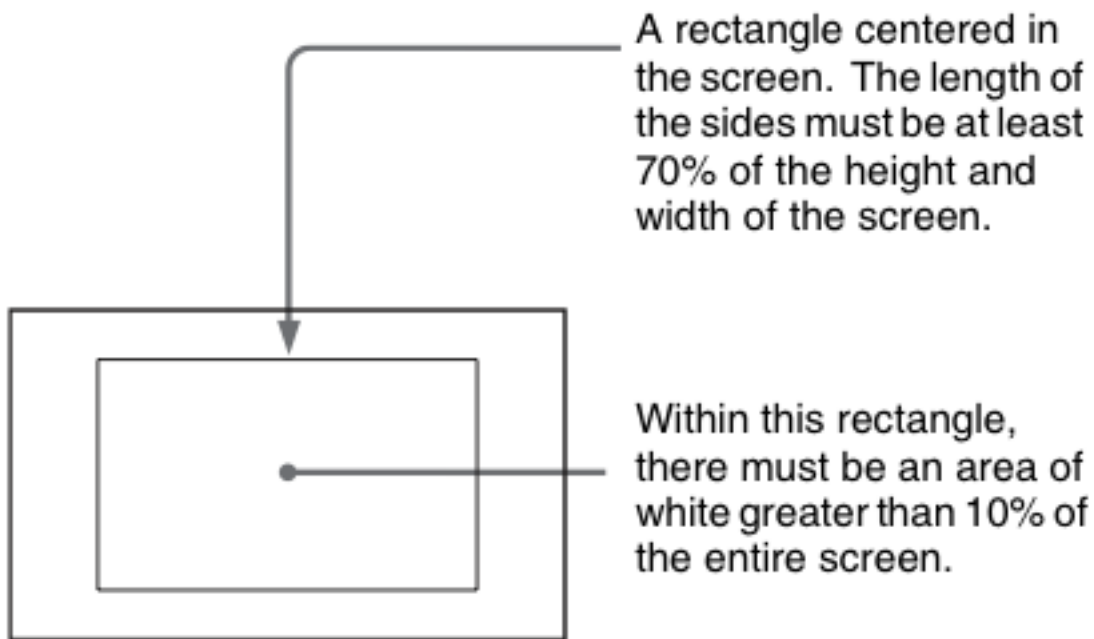
Press the CC filter select button while holding the FILTER LOCAL button depressed. Each press of the select button switches the available CC filters (cross, 3200K, 4300K, 6300K, 8000K) in sequence.



ND Filter		Color temperature conversion filter	
1	clear	A	cross filter
2	1/4 ND	B	3200K (clear)
3	1/8 ND	C	4300K
4	1/16 ND	D	6300 K
5	1/64 ND	E	8000 K

3 Place a white pattern in the same lighting conditions as the subject, and zoom in on it so that a white area is obtained in the screen to satisfy the positional and quantitative requirements illustrated below.

A white object (white cloth, a white wall, etc.) near the subject may be used in place of a white pattern.



Note

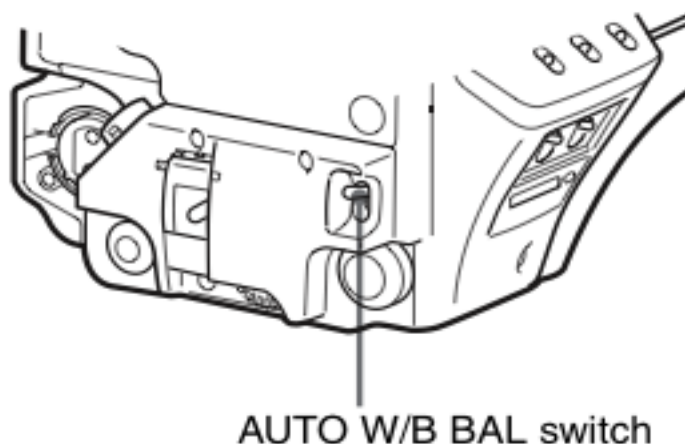
Be careful not to have any spots of high illumination in the rectangle.

4 Adjust the lens iris opening.

With a manually adjusted lens: Set the opening to an appropriate value.

With a lens which has automatic iris control: Set the lens' automatic/manual iris control switch to automatic.

5 Push the AUTO W/B BAL switch to WHT and release the switch.



The switch will return to the center position, and adjustment will be performed.

During adjustment, the message “AWB: OP” will be displayed in the lower left corner of the viewfinder screen. After about one second, a message like the one in the figure below will be displayed, and the adjustment process will complete. The adjusted value will be automatically stored in the memory (A or B) selected in step **1**.



Note

When using a zoom lens with automatic iris control capability, hunting¹⁾ may occur. Adjust the lens' iris gain control (labeled IG, IS, S, etc.).

1)Hunting: The automatic iris responds over and over, and the image repeatedly darkens and lightens.

For more information, refer to the lens' operation manual.

When automatic white balance adjustment fails

If the white balance adjustment process does not end successfully, the error message “AWB: NG” will be displayed on the viewfinder screen for approximately three seconds.

If this error message is displayed, try black balance adjustment again.

If the error message continues to be displayed after several attempts, the camera requires internal inspection.

When there is no time to adjust the white balance

Set the WHITE BAL switch to PRST. The white balance will be set automatically according to the filter settings.

About white balance memory

The white balance values stored in memory will be preserved even when the camera power is turned off. There are two white balance memories, A and B. When the AUTO W/B BAL switch is pushed to the WHT side, the white balance will be adjusted automatically according to the filter settings. The adjusted value will be stored in the selected memory. Each memory can store up to five adjusted values, for a total of 10.

Setting the Electronic Shutter

This section explains the different modes which can be used for the electronic shutter, and gives the procedures for setting the shutter mode and shutter speed.

Note

When a camera control unit or a remote control device, such as MSU-900/950 and the RCP-700-series

Remote Control Panel, is connected, the electronic shutter is controlled from the external control device and control on the camera are disabled.

About the shutter modes

The different shutter modes which can be used with the electronic shutter of the camera, and the shutter speeds which may be selected, are as follows:

Shutter modes and speeds

Shutter mode	Shutter speeds ¹⁾	Usage
Standard	100, 1/125, 1/250, 1/500, 1/1000, 1/2000 second	Use to obtain clear images of quickly-moving subjects
ECS (Extended Clear Scan)	Continuously variable in the range from 60.0 Hz to 4300 Hz	Use to obtain images of computer monitors without horizontal striping

1)The values in the table are those with 60i/59.94i. With other formats, the available values may be different.

Note

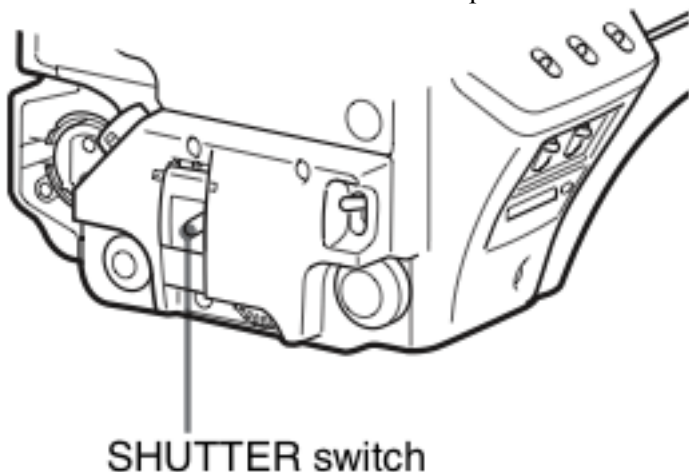
With artificial lighting, particularly fluorescent lights and mercury vapor lamps, the brightness appears to be constant, but in fact the strength of the red, green, and blue components varies at the power supply frequency. This phenomenon is known as “flicker”. When using the electronic shutter under these lighting conditions, there are certain cases in which the flicker is more noticeable. In particular, color flicker is evident when the power frequency is 60 Hz. In areas where the power frequency is 50 Hz, setting the shutter speed to 1/100 second will reduce the flicker.

Selecting the shutter mode and speed

The shutter mode, and the shutter speed in standard mode, are set using the SHUTTER switch.

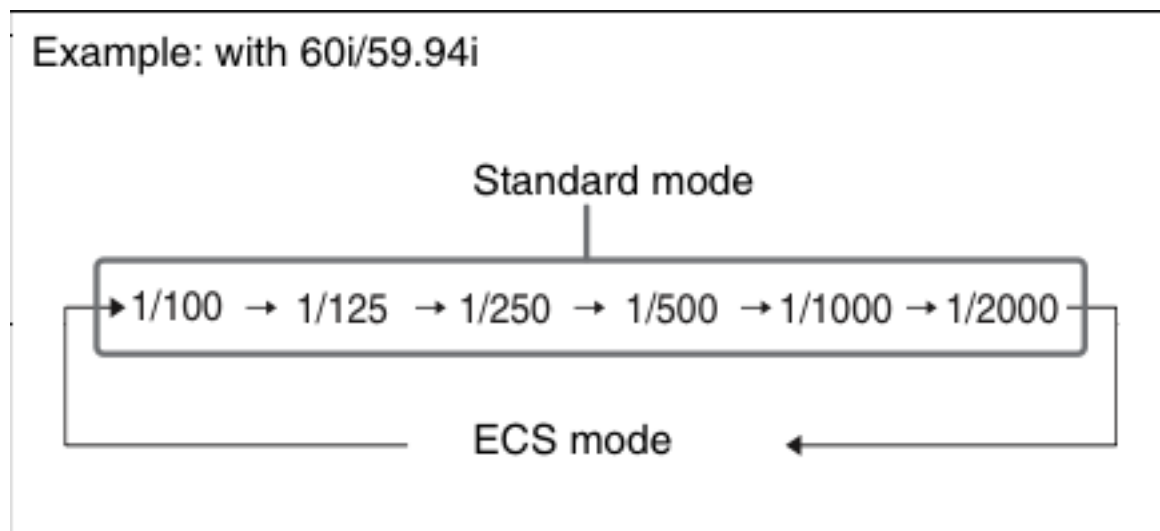
Setting the shutter mode, and shutter speed in standard mode

1 Push the SHUTTER switch from the ON position to the SEL position.



The current shutter setting will be displayed in the setting change/adjustment progress message display area of the viewfinder screen for about three seconds. Example: “Shutter: 1/250”

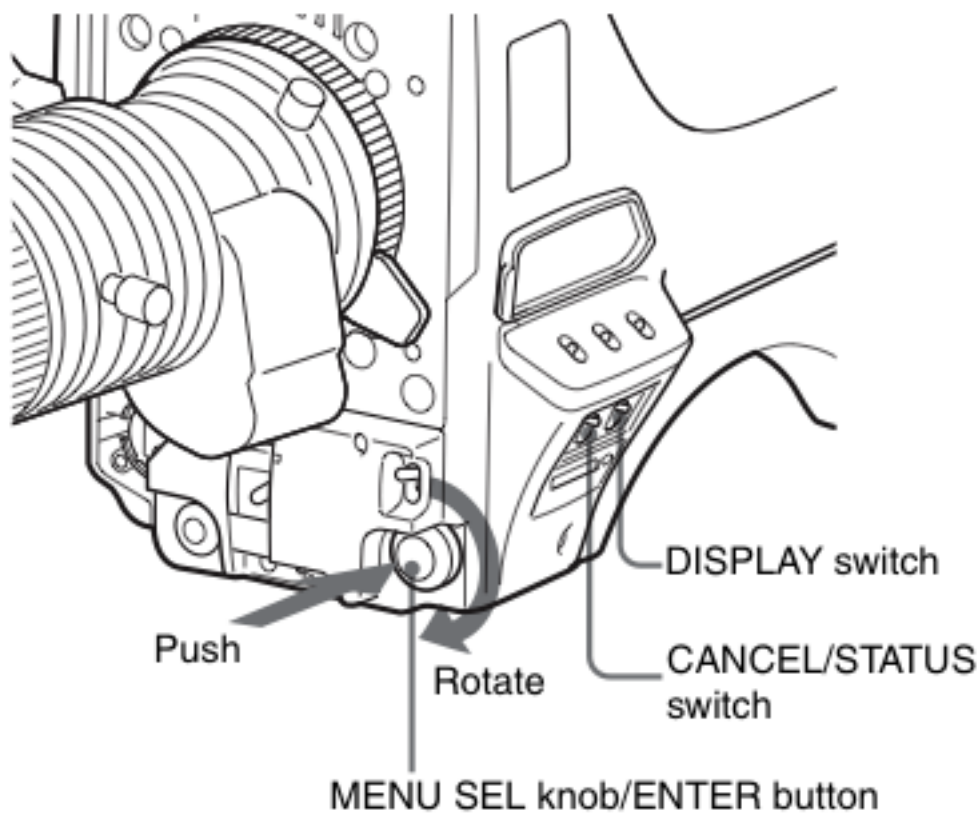
2 Push the SHUTTER switch to the SEL position again before the display disappears. Repeat this action until the desired mode or speed is displayed. When all modes and speeds are displayed, they will be displayed in the following order:



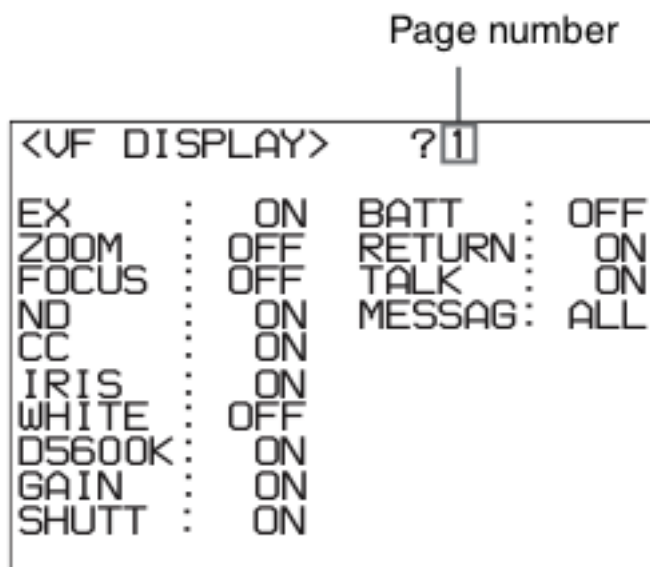
Basic Operation of the Setup Menus on the Viewfinder

When the DISPLAY switch is set to MENU, the setup menus will be displayed on the viewfinder screen. The menus are used to select various setting values, and to select items which will be displayed on the viewfinder screen and how those items will be displayed.

The following parts are used to operate the menus.



- 1** Move the DISPLAY switch from OFF to MENU. The menu screen will be displayed.



- 2** Rotate the MENU SEL knob/ENTER button to display the desired page.
- 3** Push the MENU SEL knob/ENTER button. The setting items for the selected page will be displayed, with an arrow (c) marking the currently selected item.

<VF DISPLAY>		1	
EX	: → ON	BATT	: OFF
ZOOM	: OFF	RETURN	: ON
FOCUS	: OFF	TALK	: ON
ND	: ON	MESSAG	: ALL
CC	: ON		
IRIS	: ON		
WHITE	: OFF		
D5600K	: ON		
GAIN	: ON		
SHUTT	: ON		

4 Rotate the MENU SEL knob/ENTER button to align the arrow marker (c) with the desired item.

5 Push the MENU SEL knob/ENTER button. The arrow marker (c) will change to a question mark (?) and begin flashing.

6 Rotate the MENU SEL knob/ENTER button to change the setting value.

When the knob is rotated quickly, the values will change quickly; when rotated slowly, the values will change slowly.

To reset a changed value

If you press the CANCEL/STATUS switch toward CANCEL before pressing the MENU SEL knob/ENTER button, the setting will be returned to its previous value.

To interrupt settings

Set the DISPLAY switch to OFF to turn off the menu screen display.

The setting can be restarted by setting the DISPLAY switch back to MENU.

7 Push the MENU SEL knob/ENTER button. The “?” mark will change back to the arrow marker (c), and the new setting will be saved.

8 To change other setting items on the same menu page, repeat steps **4** through **7**.

9 To change to another page, press MENU SEL knob/ ENTER button several times until the page scroll bar appears on the top right corner of the screen, then repeat steps **2** and **3**. The setting items for the selected page will be displayed, with the arrow marker (c) at the currently selected item.

To end menu operations

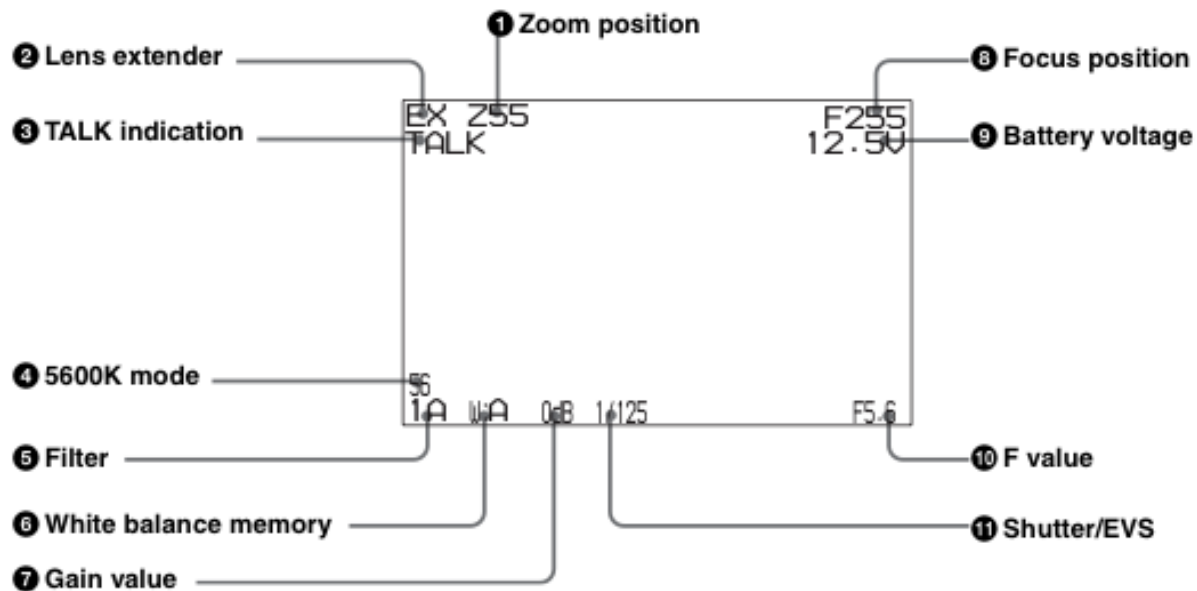
Set the DISPLAY switch to OFF.

Viewfinder Screen Status Display

Besides the video image, the viewfinder can display text and messages showing the camera settings and operation status, as well as items such as a center marker or safety zone marker. When the DISPLAY switch is set to ON, items set to ON using the menu or related switches will be displayed on the upper and lower edges of the screen. Also, messages informing of setting values or adjustment progress and results may be displayed for approximately three seconds when settings are changed, or during the process of or after adjustment.

Organization of Viewfinder Screen Status Display

All the items which may be displayed on the viewfinder screen are located as shown in the figure below.



a) Zoom position

Indicates the approximate position of the zoom lens variator between wide angle (0) and telephoto (99). Shows how close it is to the telephoto side.

b) Lens extender

“EX” is displayed when a lens extender is in use.

c) TALK indication

Displayed when the intercom microphone is set to ON.

d) 5600K mode

Displayed when 5600K is set to ON.

e) Filter

Displays the type of filter currently selected. The number (1, 2, 3, 4, or 5) indicates the ND filter, and the letter (A, B, C, D or E) is for the CC filter.

f) White balance memory

Displays the currently selected white balance automatic adjustment memory.

W:A: The WHITE BAL switch is set to “A”

W:B: The WHITE BAL switch is set to “B”

W:P: The WHITE BAL switch is set to “PRST”

g) Gain value

Displays the video gain value (dB) set with the GAIN switch.

h) Focus position

Shows the focus position of a zoom lens as a numeric value (0 to 255 (infinity)).

i) Battery voltage

Displays the input voltage.

j) F value

Indicates the lens F (iris opening) value.

k) **Shutter/EVS**

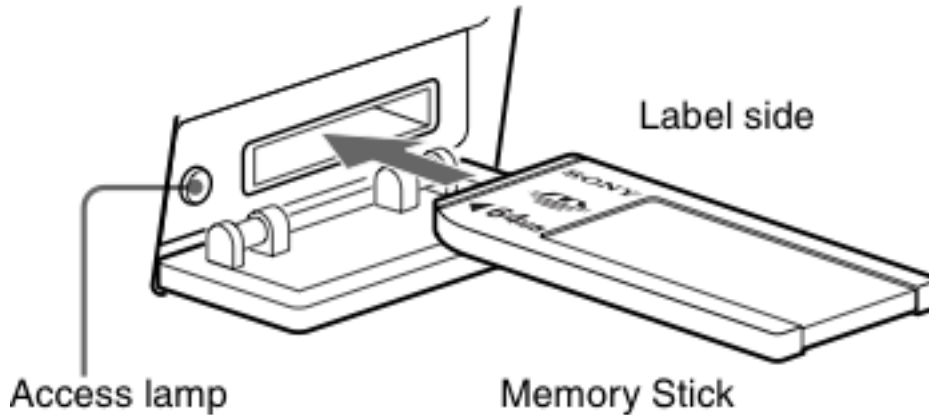
Displays the shutter/EVS status. Nothing is displayed if both the electronic shutter and EVS are set to OFF.

Using a “Memory Stick”

When a “Memory Stick” is inserted in the camera, the file data can be stored on the “Memory Stick,” which enables you to share data among cameras.

Inserting a “Memory Stick”

Insert a “Memory Stick” with the label side up into the “Memory Stick” slot until it clicks and the access lamp lights in red.



Access lamp

If the access lamp is lit or is flashing, data is being read from or written to the “Memory Stick.” At this time, do not shake the product or subject it to shock. Do not turn off the power of the product or remove the “Memory Stick.” This may damage the data.

What is “Memory Stick”?

“Memory Stick” is a new compact, portable and versatile IC (Integrated Circuit) recording medium with a data capacity that exceeds a floppy disk. “Memory Stick” is specially designed for exchanging and sharing digital data among “Memory Stick” compatible products. Because it is removable, “Memory Stick” can also be used for external data storage. “Memory Stick” is available in two sizes: standard size and compact “Memory Stick Duo” size. Once attached to a “Memory Stick Duo” adapter, “Memory Stick Duo” turns to the same size as standard “Memory Stick” and thus can be used with products compliant with standard “Memory Stick”.

Types of “Memory Stick”

“Memory Stick” is available in the following types to meet various requirements in functions:

“Memory Stick-R”

Stored data are not overwritten. You can write data to “Memory Stick-R” with “Memory Stick-R” compatible products only. Copyright protected data that requires MagicGate copyright protection technology cannot be written to “Memory Stick-R.”

“Memory Stick”

Stores any type of data except copyright-protected data that requires the MagicGate copyright protection technology.

“MagicGate Memory Stick”

Equipped with the MagicGate copyright protection technology.

“Memory Stick-ROM”

Stores pre-recorded, read-only data. You cannot record on “Memory Stick-ROM” or erase the pre-recorded data.

“Memory Stick PRO”

“Memory Stick” with MagicGate copyright protection technology, exclusive for “Memory Stick PRO”-compliant products.

Usable types of “Memory Stick”

You can use a “Memory Stick” or a “MagicGate Memory Stick” with this product. However, the MagicGate copyright protection is not valid with this product.

Note

You cannot use a “Memory Stick Duo” without an appropriate adaptor.

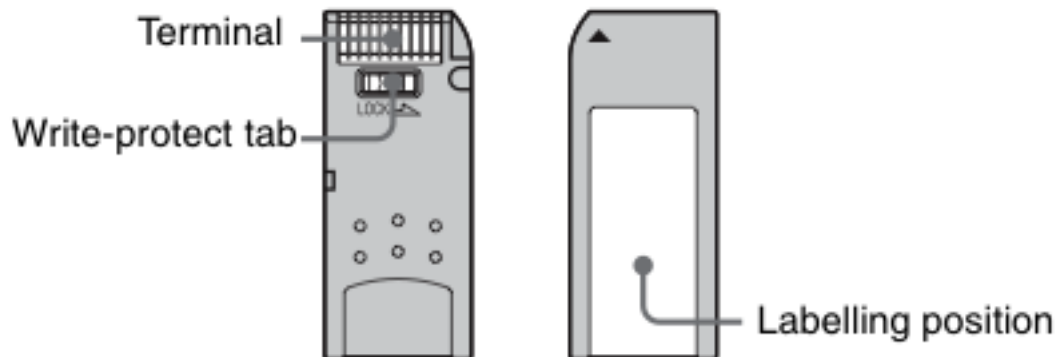
Note on data read/write speed

Data read/write speed may vary depending on the combination of the “Memory Stick” and “Memory Stick” compliant product you use.

What is MagicGate?

MagicGate is copyright protection technology that uses encryption technology.

About a “Memory Stick”



- When you set the “Memory Stick” erasure prevention switch to “LOCK,” data cannot be recorded, edited, or erased.
- Data may be damaged if:
 - You remove the “Memory Stick” or turn off the unit while it is reading or writing data.
 - You use the “Memory Stick” in a location subject to the effects of static electricity or electric noise.
- We recommend that you make a backup copy of important data that you record on the “Memory Stick”.

Note

- Do not attach anything other than the supplied label to the “Memory Stick” labeling position.
- Attach the label so that it does not stick out beyond the labeling position.
- Carry and store the “Memory Stick” in its case.
- Do not touch the connector of the “Memory Stick” with anything, including your finger or metallic objects.
- Do not strike, bend, or drop the “Memory Stick”.
- Do not disassemble or modify the “Memory Stick”.
- Do not allow the “Memory Stick” to get wet.
- Do not use or store the “Memory Stick” in a location that is:
 - Extremely hot, such as in a car parked in the sun
 - Under direct sunlight
 - Very humid or subject to corrosive substances

Precautions

- To prevent data loss, make backups of data frequently. In no event will Sony be liable for any loss of data.
- Unauthorized recording may be contrary to the provisions of copyright law. When you use a “Memory Stick” that has been pre-recorded, be sure that the material has been recorded in accordance with copyright and other applicable laws.
- The “Memory Stick” application software may be modified or changed by Sony without prior notice.
- Note that there are certain restrictions on recording stage performances and other entertainment events, even if they are recorded for personal use only.

- “Memory Stick”,  and “MagicGate Memory Stick” are trademarks of Sony Corporation.
- “Memory Stick Duo” and **MEMORY STICK DUO** are trademarks of Sony Corporation.
- “Memory Stick PRO” and **MEMORY STICK PRO** are trademarks of Sony Corporation.
- “MagicGate” and **MAGICGATE** are trademarks of Sony Corporation.

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- “Memory Stick Duo” and are trademarks of Sony Corporation.
- “Memory Stick PRO” and are trademarks of Sony Corporation.
- “MagicGate” and are trademarks of Sony Corporation.

Specifications

General

Power requirements 240 V AC, 1.4 A (max.)
180 V DC, 1.0 A (max.)

12 V DC, 7 A (max.)

Operating temperature

20°C to +45°C (4°F to +113°F)

Storage temperature 20°C to +60°C (4°F to +140°F)

Mass Approx. 4.5 kg (9 lb 15 oz) (camera head only)

Imager

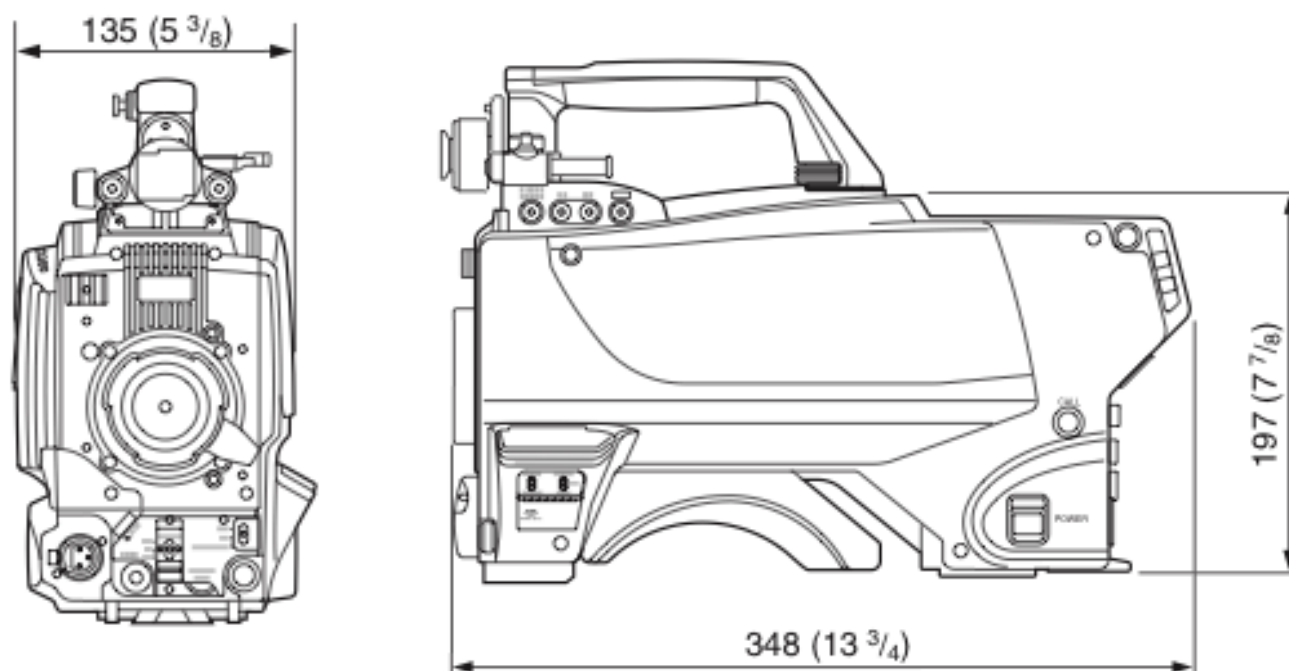
Imager	2/3-type Progressive Scan CCD
Method	3-CCD, RGB
Effective resolution	1920 (horizontal) × 1080 (vertical)

Electrical characteristics

Sensitivity	f10.0 (at 2000 lx with 89.9% reflectivity)
Image S/N	Typical 54 dB
Horizontal resolution	1000 TV lines (at center of screen) 5% or higher modulation
Registration	0.02% for total area (not including lens distortion)
Geometric distortion	Negligible (not including lens distortion)

Dimensions

Unit: mm (inches)



Optical system specifications

Spectral system	F1.4 prism
Built-in filters	Color temperature conversion filters
	A: cross filter
	B: 3200K (clear)
	C: 4300K
	D: 6300K
	E: 8000K
	ND filters
	1: clear
	2: 1/4 ND
	3: 1/8 ND
	4: 1/16 ND
	5: 1/64 ND

Input/output connectors

CCU	Electro-multi connector (1)
LENS	12-pin (1)
VF	20-pin (1)
MIC 1 IN	XLR 3-pin, female (1)
AUDIO IN CH1, CH2	XLR 3-pin, female (1 each)
INCOM1, INCOM2XLR	5-pin, female (1 each)
EARPHONE	Stereo minijack (1)
DC	IN XLR 4-pin (1), 10.5 to 17 V DC
DC	OUT 4-pin (1), 10.5 to 17 V DC, 1.5 A maximum It may be limited depending on the load and input conditions.
SDI 1, 2	BNC type (1 each)
TEST OUT	BNC type (1)
PROMPTER OUT	BNC type (1), 1 Vp-p, 75 ohms
RET CONT	6-pin (1)
REMOTE	8-pin (1)
TRACKER	10-pin (1)
CRANE	12-pin (1)

Supplied accessories

Operation manual (1)
Switch label 1, 2 (1 each)

Optional accessories

HDVF-20A HD Electronic Viewfinder (2-type, monochrome)
HDVF-C30W HD Electronic Viewfinder (3-type, color)
HDVF-C750W HD Electronic Viewfinder (7-type, color)
HDLA1500 Large Lens Adaptor
CAC-12 Microphone Holder
CAC-6 Return Video Selector
BKW-401 Viewfinder Rotation Bracket
VCT-14 Tripod Adaptor
Memory Stick

Related equipment

HDCU1000/1500 HD Camera Control Unit

MSU-900/950 Master Setup Unit

RCP-700-series Remote Control Panel

VCS-700 Video Selector

CNU-700 Camera Command Network Unit

Connectors for optical/electric composite cables:

- LEMO (R) PUW.3K.93C.TLCC96 (to the “CAMERA” connector on CCU)
- LEMO (R) FUW.3K.93C.TLMC96 (to the “CCU” connector on CAMERA)

Caution on the optical/electric composite cable:

For connection between the camera control unit and a camera, be sure to use an optical/electric signal composite cable with the connectors specified in this manual in order to comply with the limit for EMC regulations.

Connecteurs pour les câbles optiques/électriques composites:

- LEMO (R) PUW.3K.93C.TLCC96 (au connecteur « CAMERA » de l'unité de commande de caméra)
- LEMO (R) FUW.3K.93C.TLMC96 (au connecteur « CCU » de la caméra)

Précaution concernant le câble optique/électrique composite:

Pour la connexion entre l'unité de commande de caméra et une caméra, utilisez un câble optique/électrique composite avec connecteurs spécifiés dans ce manuel pour assurer la conformité avec la réglementation EMC.

Anschlüsse für optische/elektrische FBAS-Kabel:

- LEMO (R) PUW.3K.93C.TLCC96 (an „CAMERA“- Anschluss an der Kamerasteuereinheit)
- LEMO (R) FUW.3K.93C.TLMC96 (an „CCU“- Anschluss an der KAMERA)

Vorsichtsmaßnahmen für optische/elektrische FBAS- Kabel:

Für Verbindung zwischen Kamerasteuereinheit und Kamera verwenden Sie immer ein optisches/elektrisches FBAS-Kabel mit Steckern, wie in dieser Anleitung beschrieben, um die Grenzwerte der geltenden EMV-Vorschriften zu erfüllen. Design and specifications are subject to change without notice.

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HDC1500 Series (J/UC/CE/SYL)

3-868-749-02(2)

Sony Corporation